



BETTER FRUIT

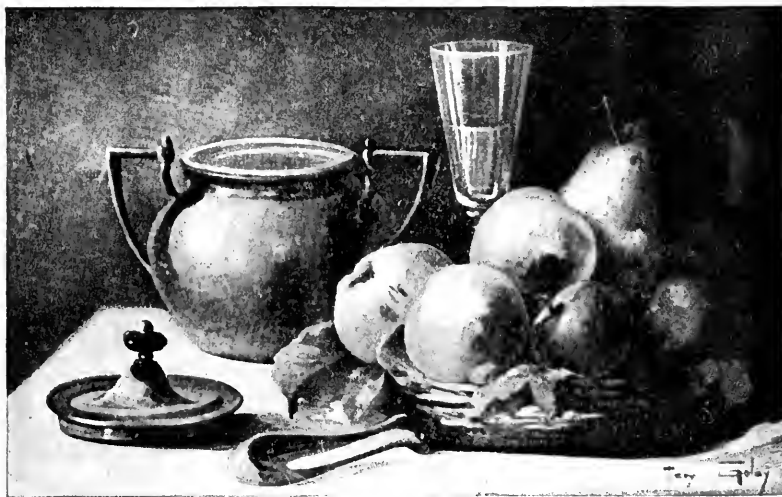
VOLUME XV

JULY, 1920

NUMBER 1

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Yakima Valley Apple Packing Houses
Preventing Brown Rot in Apricots
The Codling Moth in Walnuts

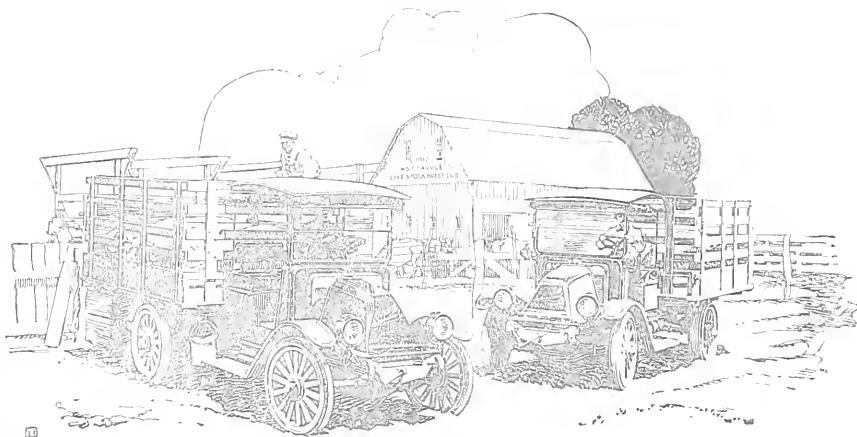


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GASOLINE

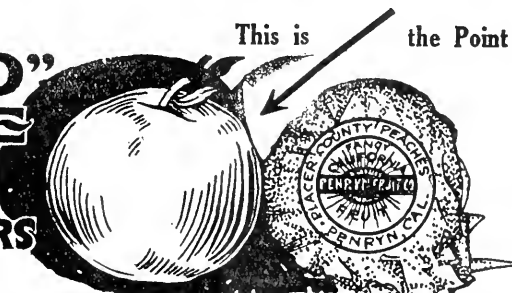
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"Caro" Protects

"Caro" from DessiCARE (to dry up)

"Caro"
Prolongs the
Life of Fruit
Why?

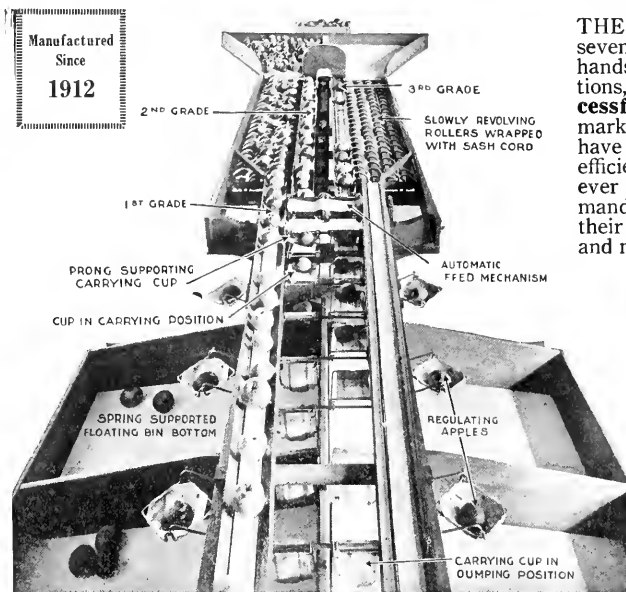
Fruit decomposition starts from a bruise which opens tiny holes and permits the juice to escape and BACTERIA to enter. "Caro" clings closely and dries up the escaping juice. "Caro" ingredients harden the spot, kill the BACTERIA, arrests the decomposition—and thus **PROLONGS THE LIFE OF FRUIT.** If your fruit is worth shipping it is worth keeping in best condition.

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For Box, Basket or Barrel Packing



Upper View of a portion of the Four-Section Model for box packing, showing the Mechanical Sorting Table. No hand feeding necessary. The fruit is fed automatically. This table slowly revolves the fruit as it is moved forward before the sorters. Our belt type of sorting table can be furnished if desired.

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(1) **Off-Grade Return Belts** which afford a means for bringing back to the sorters the off-grade fruit found in the bins. This makes an immediate check on the sorters and will result in a better grade of fruit being packed.

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.....Grader.Gravity Carrier.

.....Box Press.Grip Trucks.

Crop expected in 1920.....boxes.

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Address

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We carry a stock of the CALIFORNIA GRIP TRUCKS

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BETTER FRUIT

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NUMBER 1

Keeping Production Records by Growers of Small Fruit

By Wm. E. Schimpf, Secretary Oregon Cranberry Growers' Association

THE keeping of accurate production records has always been a serious problem to the fruit grower. During the exciting period of the harvest the best system is liable to be neglected and thereupon immediately ceases to be a system and becomes an aggravation. Accurate production records are desired by every fruit grower, and the problem has been to secure a system which would be accurate and yet so simple as to be practically automatic.

During the harvest season everything seems to be very much of a mad race. Where up to this time on a cranberry bog one or two people have been employed on a twenty-five acre bog, now a hundred or more are needed. Pickers of all ages, races and creeds assemble to gather the festive little berry. With this army of people we have the same old problems. The fruit grower has a strenuous though not altogether uninteresting time during this exciting period.

Now in order to know what he is doing, he should know what he is producing. It is just as important to the cranberry grower to keep accurate production records as it is to the dairyman. Fruit growing is a business just as much as selling hats. No one would think of engaging in any mercantile business such as selling hats without opening up a set of books. Fruit growers are willing to do this, and have been anxious to have some simple method devised which would really be of assistance to them in the keeping of such accurate records. One advantage the fruit grower has over his fellow business man, and that is he is selling but one commodity.

The average fruit grower is well above the average person in intelligence and it is not from ignorance of their value that precise production records are kept, nor is it from unwillingness. When the end of the harvest day comes the grower feels that he has earned a well deserved rest, and though he knows that he should tabulate the results of his day's work, he is usually so tired physically that the very thought of bookkeeping appalls him.

A system that in itself would be so simple as to keep its own record, was

the problem which demanded solution. One of the members of the Oregon Cranberry Growers' Association has devised just such a system. It has been in use by him for three years, and last season was adopted by every member of the association. The dominant feature of the system is the use of consecutively numbered tickets similar to those used in the movies. At the beginning of the picking day it is only necessary to make a memorandum of the opening number for the day, and to record the closing number at night.

This in itself gives a correct record of the number of boxes picked during the day, and shows what the picking cost should be. The difference between the number on the ticket at the end of the ribbon in the morning and number on the ticket at the end of the ribbon in the evening, must agree with the number of boxes taken from the pickers. Slight discrepancies will occur, and these discrepancies are at once called to the attention of the checker, who gives out the tickets. There can be no dispute, and there is none. An explanation should be had. It will happen that a ticket too many will be given out by the checker, but this fact is immediately recognized by the grower.

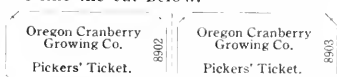
Checkers really like the system, for they know that their work is automatically audited. Not only is this system a perfect check upon the person giving out the tickets, but it can be used as a check upon the picker as well. One bright young lady who was giving out tickets for a Clatsop cranberry grower, would always ask to see all of the tickets of the picker whenever the question arose as to whether a ticket had been given for the last box or not. An examination of the tickets usually showed one ticket with a number just preceding the one on the ticket roll, and the picker was satisfied.

Pickers' tickets can be obtained from the moving picture supply houses, they are printed in various colors, and can be had with the name of the grower, the denomination and of course the serial number. Stores in the immediate locality are glad to cash these tickets, as they bring business to their places of business. Later the grower takes them from the storekeeper in lots, issuing his check for this purpose. If

such an arrangement can be made it is of decided value to the grower, as it will mean that he must keep but little cash on hand.

Sometimes it is advisable to furnish some store with a working capital of a sufficient amount so that the storekeeper will not have to use too much of his own funds. From time to time as the tickets come in to the store they can be taken up by the grower in good sized lots. This system has the advantage of keeping the picking money distinct and separate from the grower's own cash. Every grower realizes the difficulty in keeping his own money distinct from the picking money during the rush of the harvesting season. The grower usually gets all of his wife's spare change, as well as his children's savings into his harvest fund before he realizes it.

With a system of serially numbered tickets, the difference between the first number of the season and the number left on the ribbon at the end of the season, indicates the exact number of boxes picked during the season. This at once shows him his harvesting cost, that is, it shows him exactly how much money he is to pay out for fruit picked. Tickets used by the cranberry growers are like the cut below.



In connection with these tickets a daily report sheet is used by the cranberry growers of Clatsop County. This report has a space for recording the first ticket given out in the morning, and the last in the evening, a check in the way of the actual count of the number of boxes taken into the warehouse. Distribution of the costs of picking, trucking, checking and other harvesting costs can be made on this daily sheet if it is so desired.

Practically this same sheet is used for the season's report. To make out a report for the entire season will take but little longer than to make out the daily report. The tickets given out by the checker to the pickers have kept right on numbering themselves throughout the entire season, and it is but a matter

of simple subtraction to determine the whole number of boxes harvested for the season. In fact a season's report can be made out and has been made out in fifteen minutes.

The report is really in two parts, one part on which the statistical records are kept, as has just been described above, while the other part of the report sheet is a diagrammatic representation of the bog itself, on which the particular section being picked that day is shaded, and such other remarks made which will be of interest to the grower in the years to come. The purpose being to give the proper production credit to those particular sections of the marsh which so deserve the credit. This being very much in the same manner as the dairyman tries to give every cow her proper credit.

The advantage of this can be readily seen. To illustrate, during the past season one Clatsop cranberry grower, who had kept accurate production records of his marsh for the preceding year, was able to estimate his entire crop to a surprising degree of accuracy after picking a single acre. The variation between his estimate and the crop actually picked being about one per cent.

The use of this system is strongly recommended to every grower of small fruit, where the picker is paid by the piece. The system is not theoretical, but is intensely practical. Its results are final and absolute. The numbering on the tickets is as accurate as an adding machine's computations. It is simplicity itself and will be found not only interesting but fascinating as well.

Below is a daily report as taken from one of the picking days during the cranberry harvesting season:

The use of the numbered tickets will well repay the grower as against the old method of using the same tickets over and over again. The tickets should be used but once and destroyed. Their cost is but slight, and their use so very satisfactory, that once the grower uses them, he will never go back to any other system. Should the grower use only the tickets and not the daily report sheets, he will have at least accurately kept the number of units of his fruit, whether boxes, measures or carriers, for the entire season, and this information is worth the price of the tickets many times over.

Specially printed tickets can be had in rolls of 2000 tickets each. The larger the lot ordered the better the price. A grower should estimate his needs for some years to come and order enough to cover his needs for several years. In this way his ticket cost will be but little each year. Five dollars would supply tickets enough for a very large crop. Five dollars would not be too much to pay for a bookkeeper that would keep exact count of the total number of tickets given out throughout the entire season. The movie people have been awake to the value of this ticket and have used it for several years, and the mere fact that these successful business men use them universally, should be sufficient recommendation as to their value. We have no doubt but that the fruit grower will be using them just as universally within a short time.

Controlling the Cherry Fruit Fly

Cherry growers who have been the victims of the destructive work of the cherry fruit fly, an insect that heretofore

has baffled the efforts of experts to combat it will be interested in knowing that A. B. Black, assistant entomologist at the Oregon Agricultural College Experiment Station after a study of this pest extending over a considerable period is able to give methods for its control.

The remedy announced by Mr. Black to check the cherry fruit fly is to spray with a solution of one pound of basic arsenate of lead to 16 gallons of water, to which should be added four pounds of brown sugar or one gallon of some sweet syrup. This solution should be applied to the trees from a nozzle giving a coarse mist, each tree receiving a quantity of spray equivalent to about a pint. The first application should be made about June 10 and two following applications put on at an interval of five to seven days. If rains occur a new application should be made as soon as the trees dry off.

The cherry fruit fly lays its eggs on the fruit, injecting them just under the skin. These eggs hatch into small maggots which burrow into the fruit where they feed for a period of 15 to 20 days rendering it unfit for use. On leaving the fruits the maggots drop to the ground where they burrow in and remain until the following spring, emerging usually about the latter part of May as adult flies. Fond of moisture, the fly is said by Mr. Black to appear on the fruit early in the morning, where it may be seen drinking dew from the leaves. After the dew has dried off is the time recommended to apply the spraying solution alluded to above.

Plot No. 101 1.09 acres	Plot No. 102 0.63 acre
Plot No. 103 1.00 acre	
Plot No. 104 1.02 acres	
Plot No. 105 1.01 acres	
Plot No. 106 1.02 acres	16
Plot No. 107 1.44 acres	
Plot No. 108 0.82 acre	

MARSH OF CLATSOP CRANBERRY COMPANY Allendale, Oregon

Wednesday, October 8, 1919.

Weather: A.M. Fair.
P.M. Fair.
Begin 8:30.
Ended 5:45.

Plot No. 116 1.63 acres	Plot No. 115 1.00 acre	76
Plot No. 111 1.02 acres	No. 111 0.33 acre	No. 112 0.69 acre
No. 109 0.17 acre	No. 110 0.17 acre	No. 113 0.71 acre

DAILY REPORT No. 15.

Previous day's final ticket number.....	20810
Today's final ticket number.....	21114
Difference	304
Number measures picked.....	304
Equivalent in crates	76
Number of crates raked.....	16
Total for day.....	92
Previous day's season's total.....	873
Today's season's total	965
Number pickers	27
304 Measures at 25c	\$76.00
Total picking cost	\$76.00
Picking cost per measure .....	.25
Picking cost per crate.....	1.00
2 Rakers at \$5.00 per day.....	10.00
Total raking cost	10.00
Raking cost per crate.....	.62½
1 Truckman at \$5.00 per day.....	5.00
1 Checker at \$2.50 per day.....	2.50
Total trucking and checking cost.....	7.50
Trucking and checking cost per crate.....	.08
Total harvesting cost	93.50
Harvesting cost per crate.....	1.02

Remarks: Anderson sisters made \$9.75 today, one picking 19, other 20 measures.

Yakima Valley, Washington, Apple Packing Houses

By C. L. Robinson

WITH the ever increasing cost of packing and the serious car shortages we may expect, it is very evident that we must pay more attention to our packing and warehousing facilities in our fruit growing districts in order to do all possible to cut down the expense of handling and to protect the fruit until it is shipped. As one looks over the various types of warehouses and the methods of construction he is impressed with the lack of a standard. In many houses we find details of poor construction and arrangement while in others we may learn of points of interest and benefit. Frequently in attempting to keep down the cost of building the owners have sacrificed economy in handling. Some growers, under special conditions may be able to get along with a tent or shed but as a rule experience has shown that cheap construction does not pay.

In the Yakima Valley, Washington, we have two main kinds of warehouses and packing houses, those on the farm and those at the shipping points used by the growers' organizations and dealers. In this county we have cold storage for about one-fourth of the apple crop and some kind of common storage for about one-half of the crop. Among the many examples of packing and storage houses we may select a few as typical of the better class of more recent construction.

The first illustration shows a popular type combining a warehouse and barn. This building was erected about three years ago by Mr. G. M. Carlos on his forty-acre orchard near Selah and would now cost about \$7,000. The apple storage part is 40x60 feet with a capacity of 11,000 boxes and is of hollow tile construction with a concrete floor and air ducts leading to the cupolas. The air intake is through troughs in the floor which have water in the bottom and a grating on top. By proper management of these vents a fairly good temperature has been maintained in the storage room. There are, however, only four of these intakes when twice as many would be much more desirable in order to increase the air circulation. The hay loft overhead holds forty tons and the lean-to on one side is used at one end for a barn and at the other for a packing house through which 200 boxes a day may be handled. It would be better if this room were larger and had a skylight in the roof. The storage room has the advantage of being separate from the packing room and has double doors and windows.

This type of building is fairly popular but with the increased use of tractors, the many reports of poisoned orchard hay and the agitation to work more of the alfalfa into the soil, we may expect its popularity to be transferred to a warehouse without the barn feature.

The second illustration covers a very good packing and storage house built

by Mr. A. F. Conlon on his fifty-acre orchard also near Selah. It is perhaps more expensive than most growers would build for though originally built for \$4300 it would now cost about \$7000. It is also of hollow tile construction and has the advantage of being built on a side hill where the second story is readily accessible. Its capacity for storage is about 20,000 boxes but the upper story is usually used for sorting and packing. The basement has an earth floor with provisions for wetting it and with a grate flooring two feet above. Twelve adjustable air intakes and good ducts leading to the skylight provide for circulation. An interesting feature is a telescope air shaft through the second story which may be put out of the way during the day when the floor is used for sorting and packing. The building is to be equipped with an elevator and now uses an endless belt grader and a Cowan Lift for trucking fifty boxes of fruit at one time.

The third illustration is of the extremely simple type. It is of very cheap construction, in fact too much so to be desirable, but would be practically frost proof, if the roof, doors and windows were doubled. A very even temperature was maintained a year ago

for early cooling and storage by good management in opening the large double doors at the near end and a smaller one at the opposite end at night and closing them in the morning. Too little attention was paid to proper light and convenience for sorting and packing.

The fourth illustration shows a house of the community type operated by the Horticultural Union which will handle 3,000 to 1,000 boxes per day. The packed fruit is received at the doors on the left and the unpacked fruit at the conveyor lift at the right center. These arrangements make for little delay to the man bringing the fruit. The sorting and packing room is on the second floor where skylights are available and the roller conveyor system carries the fruit to all parts of the house. Here 1200 boxes are packed per day without the aid of a mechanical grader, and the building will care for 55 cars of apples in common storage.

Some of the medium sized houses use a cheap frame section for their packing room and an insulated storage room of better construction. Too many houses use a pent-house for overhead light when a skylight would be cheaper, give better light and keep the room warmer during cold weather. Some houses are



A Combination Apple Storage House and Barn.



A Good Type of Storage House.

so built that a partition separates the unpacked fruit from the sorting table in such a way that the fruit may be dumped on the end of the machine in the storage room and then carried through the partition to the packing room which may be heated for the comfort of the sorters and packers. One warehouse here is now equipped with portable electric operated belt conveyors which have proven quite successful in taking the fruit into the building and distributing it. The sections are about 20 feet long and may be moved about at will. Most of the larger organizations and dealers now have cold storage and in these plants the packing room is frequently found on the upper floor with skylight and wall light to assist the sorters and packers. The best arranged houses have a room into which the fresh fruit may be received and kept cool until time to pack. The fruit is then moved by means of conveyors to the sorters and from the sorters direct to the packers bins. Conveyors then carry it past the nailer to the storage room without interruption. Some of the farm packing houses follow out this principle to good advantage but far too many of them make no adequate provision for caring for the fruit in storage either before or after packing and no attention is paid to routing the fruit through the packing room in an orderly manner. Many growers might take better advantage of their present equipment in regard to

both storage and systematic and economic handling. It is a well known fact that the earlier and softer fruits especially keep much better if cooled down as soon as possible after picking but many growers do not take advantage of what means they have for getting it out of the sun and cooling it off.

As yet there seems to be no more of a standard in packing house equipment than in construction. Many people have tried out various kinds of mechanical graders and sizers and almost as frequently have discarded them. Some of the main troubles with some of these machines has been the inability to get enough fruit over them in a day, the over-crowding of a few bins with certain sizes and the large percentage of mechanically injured fruit resulting from their operation. Some of the best packs in the valley are put up from modifications of the old style canvas bottomed tables.

Perhaps the most popular method of sorting is the use of an endless belt table. These tables consist of a wide canvas belt or a series of narrow ones running the length of a long table. The table is usually divided into several lanes down which the fruit moves. The central one usually carries the unsorted apples and as they pass the sorters they are placed in the various lanes or bins at the side according to grade. The culls are dropped in pockets from which the return belt carries them to a dump at the end.

With any system so far devised the sorters and packers are prone to get the bins too full and then by mauling the fruit around cause needless stem puncturing and bruising.

As a parting word to those who contemplate building soon it would undoubtedly be worth their while to get in touch with the U. S. Bureau of Markets, Division of Storage Investigations at Spokane, Washington, or Washington, D. C., as these offices have on hand valuable information in regard to the best types and specifications for fruit warehouses.

Dried, Evaporated or Dehydrated

By Arthur W. Christie, Instructor in Fruit Products, University of California

The removal of moisture by drying in the sun has been used as a method of preservation for fruits and vegetables since biblical times. We are now witnessing the phenomenal growth of a new industry which bids fair to disturb and possibly to overshadow the earlier methods. This industry proposes to dry our fruits and vegetables by artificial means and not to depend on "old Sol," who sometimes forsakes his disciples. A large number of "drying" machines of varying construction have already appeared on the market, and frequent additions to the family are reported. A variety of terms has been used in naming these machines as well as their products. The most common terms are "dryer," "evaporator," and "dehydrator." Since there are no well defined distinctions between these various terms, the use of a number of different terms meaning essentially the same thing is confusing.

This confusion was most noticeable at the recent convention on evaporation of fruits held in San Jose, February 7, 1920, under the auspices of the Agricultural Extension Division of the University of California. Several of the speakers used the terms "dried," "evaporated," and "dehydrated" indiscriminately, it being often impossible to ascertain the speaker's real meaning. In order to clarify the terminology used in fruit drying a committee on nomenclature was appointed by the chairman of the convention, Professor W. T. Clarke. The committee included in its membership a representative of the Agricultural Experiment Station, the United States Department of Agriculture, and several men closely in touch with the commercial aspects of the situation. The membership of the committee was as follows: Chairman, A. W. Christie, instructor in fruit products, University of California; P. F. Nichols, division of dehydration, bureau of chemistry, United States Department of Agriculture, Atascadero; E. M. Sheehan, dried fruit broker, San Francisco; S. C. Simons, manager of dried vegetable department of E. Clemens Horst Company of San Francisco; H. C. Rowley, editor of "California Fruit News," San Francisco.

After thoroughly investigating the nomenclature of dried fruits and vegetables as well as the various devices for their production, this committee



An Extremely Simple Type.



Storage House of the Yakima Horticultural Union.

made the following recommendations:

1. The same drying nomenclature shall be applied to fruits and vegetables.

2. The term "dried" is applied to all fruits and vegetables preserved by removal of moisture, irrespective of the method of removal.

3. There are but two general classes of dried fruits or vegetables, namely, those dried principally by solar heat and those dried principally by artificial heat.

4. The class dried principally by solar heat shall be designated "sun-dried," by which is meant the removal of moisture by solar heat without control of temperature, humidity or air flow.

5. The class dried principally by artificial heat shall be designated either "evaporated" or "dehydrated." The

committee finds at this time no sufficient reasons for distinguishing between "evaporated" and "dehydrated." These two terms are synonymous and may be used interchangeably.

The above recommendations were first submitted to the College of Agriculture of the University of California. Dr. H. J. Webber, director of the Agricultural Experiment Station, makes the following statement:

"The nomenclature proposed by the committee has also been adopted by a committee of the college of agriculture of the University of California for use in the publications on dried fruits and vegetables."

The nomenclature committee recommends that the above definitions be adopted by all concerned. The committee feels that this would largely eliminate the existing confusion.

no injurious effects are noticeable on either fruit or foliage. The same is true of two large commercial orchards nearby which are under close observation. One of these orchards has been sprayed three years in succession with lime sulphur against the brown rot. This season it received three applications, two before the bloom and one after. The owner of this orchard feels that spraying with lime sulphur after the trees are out of bloom not only does no good whatever, but is likely to cause the fruit to be smaller than it should be.

It is impracticable to try to cut out the diseased twigs for six or eight weeks after blooming time or until after the disease has stopped advancing and new sprouts back of the diseased area have come out. Cutting before the dormant buds begin to break may be worse than useless, as it is difficult to tell whether all the diseased parts have been removed or whether one is cutting unnecessarily far back on the twigs. There is very little danger of the disease spreading from the dead or dying twigs to the fruit. All these twigs, however, should be removed, at the latest, when the winter pruning is done. Many prefer to take them out just after the fruit is harvested. This is very well, as the diseased parts are much more easily recognized then than in winter.

The best protection against the rot in the fruit is to thin the apricots so that they do not touch, even when ripe. Where fruits stand alone, moisture from dew or fogs at night will dry up so quickly that the spores of the disease are unable to germinate.

The apricot crop in the Santa Clara Valley this year was reduced perhaps 25 per cent by the brown rot. In the foothills there are some orchards with only a trace of the disease, while in the valleys and in the mountains the loss ranged from 10 per cent to 100 per cent.

The brown rot probably spreads chiefly from the spores which ripen on the decayed fruits. It is customary in harvesting for the pickers to leave the fruits showing a little rot on the trees. These dry up and hang on all winter. In the spring these mummified fruits are covered literally with tens of thousands of spores which blow away and, if they find congenial conditions on flowers or fruit, quickly germinate and grow. All mummies should be picked off and burned. At the same time, all diseased twigs should be cut out and the prunings raked up and burned.

Brown Rot of Apricots and Its Prevention

By W. L. Howard, in Charge Deciduous Fruit Station, Mountain View, California

DURING the past five or six years the brown rot disease of apricots has been rapidly on the increase in California, especially in the San Francisco Bay region and the coastal valleys. While brown rot is comparatively new to California, it is one of the oldest diseases of stone fruits in the eastern and southern states and in Europe. Strangely enough, the brown rot is a midsummer disease in the eastern states, and never attacks anything but the fruit. In California it does its chief damage by attacking the flower clusters and then quickly killing the fruiting spurs. The disease may attack the fruit of apricots and even prunes when full grown or nearly ripe. Our chief protection against damage to the ripe fruit is the dry atmospheric conditions which prevail in June and early July. Peaches, in the interior valleys particularly, are safe because the air is much too dry during July and August for the fungus to make any progress.

Weather conditions seem to have a good deal to do with the occurrence of brown rot, as it attacks the flower clusters in early spring. The colder and wetter the weather at blooming time, the greater the danger of brown rot occurrence. As a rule, the disease occurs most abundantly in low places where there is most likelihood of frost injury.

The disease appears in early spring, just after the trees are out of bloom, first attacking the blossoms, then spreading into the fruit spurs. The flower clusters are quickly destroyed, and the spurs and sometimes even the older wood are killed in a very short time. Although the rot spreads downward, it rarely kills wood that is more than two years old. The fungus may be carried into live or six-year old wood through the medium of a short spur, but here it has to stop, as it is unable to go any further. The disease is characterized by excessive gumming of affected twigs, particularly at the point where it has been checked in its spread.

In January, 1920, the University of

California established at Mountain View in the Santa Clara Valley a Deciduous Fruit Experiment Station. One of the first problems taken up was a study of control measures for the brown rot disease. Seventeen or eighteen different spray treatments were tried. At the same time several commercial orchards that had been sprayed one, two, or three times were kept under close observation. As a result of these experiments and observations, it is now believed that a single spraying of lime sulphur at winter strength, that is, one gallon of lime sulphur to nine gallons of water, if given just as the trees are coming into bloom, will control the disease. Dry lime sulphur twelve pounds in fifty gallons of water also gave good results, and Bordeaux mixture 4-5-50 was also effective.

The main thing is to spray before the flowers begin to fall. The ideal stage at which to spray would be after the latest buds are beginning to show pink and as the forward buds are beginning to open. Spraying with any materials as the trees were going out of bloom did little or no good. Spraying with lime sulphur 1-30 as the leaf buds were beginning to open caused serious injury to the foliage. Spraying with a crude oil emulsion when buds were much swollen caused no injury to the buds, probably due to the fact that the weather was cloudy. We are not yet ready to advise using oil sprays so late in the season; they are very promising, however, and will be given further trial. A miscible oil spray, applied when buds were much swollen, gave no protection whatever against the disease. The same is true of lime whitewash and of dry sulphur dusted on the trees.

Spraying when buds were swelling but none showing pink gave considerable protection, but was less satisfactory than where buds were showing pink or even opening.

The experimental trees were sprayed at different times and with different materials from February 17 to March 10, but up to the present writing (June 22)

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It will pay you big to write us to get more information and prices before you buy, for our machine will prove very satisfactory, as it has to many others for the past few years.

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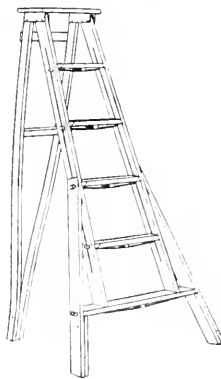
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Bits About Fruit, Fruitmen and Fruitgrowing

Sydney Stott, of Melbourne, Australia, who owns an apple orchard of 150 acres in his home country was a visitor at the office of *Burns & Faxon* recently. The reason for Mr. Stott's visit to the United States was for the purpose of determining if there was a market here for Australian apples. As the Australian crop of apples is harvested in March and April or about the time that the previous year's crop is pretty well distributed here and other Australian apple growers figured that they could probably dispose of some of their surplus fruit in the states. After a trip extending across the continent and back, however, the Australian stated that he was convinced that there was little if any market here for apples from Australia. One of the reasons for attempting to market Australian apples here this year was the fact that the English government was unable to provide sufficient ships to transport the fruit from his country to European markets. Mr. Stott's visit to the United States this year was not his first as he has made several trips to this country and on a former visit took back with him an expert packer who introduced in Australia the American method of packing apples in boxes. While the fruit growing industry in Australia is becoming a very important factor in the country's resources, Mr. Stott said that there were a number of problems confronting growers there that must be solved to place in on a more stable basis.

Joseph H. Steinhart, one of the best known fruit men in New York City and head of the firm of Steinhart & Kelly, recently moved his business into a new \$200,000 home. This new departure, or perhaps we might better say this new establishment was the occasion of Mr. Steinhart receiving many complimentary letters from men in the trade and also articles in the trade papers. The following taken from the *Fruit Trade Journal* is characteristic of what the fruit trade in New York City had to say about Mr. Steinhart personally and about his success: "Mr. Steinhart's successful career has been punctuated by long hours and hard work. After selling fruits from a peddler's wagon, this man of vision slept that the dawn might find him busy at his task. Nor were his thoughts only of markets and sales. He saws the stars and reflected that less fortunate men than he had a heart and soul as well as a brain and body and that man had far from completed his work in this world if he left the world not better than he found it. No worthy charity ever appealed to him in vain. His mind and his heart goes out to all men in need, to one case as well as another, to the remotest corners of the earth as well as at home. His firm has made a place for itself in the apple industry of the Northwest which will ever be remembered with gratitude and affection by growers. Mr. Steinhart brings to his new home a splendid staff of employees, the hope of service rather than personal success, and the good wishes of the trade which gives all the stronger ground for predilection of the highest achievement."

While we do not look on the southern states as a very large factor in the production of apples it will be interesting for the average apple grower to know that last year they produced 21,898,000 bushels of apples with a market value running up into the millions. Georgia, the state farthest south engaged in the commercial production of apples produced a crop valued at \$1,518,000.

Early reports of apple crop prospects outside of the Northwest are that New York and New England looks for normal crops; Maryland for a better crop than last year, while Virginia expects about 60 per cent of the 1919 crop. Due to the freeze in the early spring Missouri reports about 45 per cent of a full yield while southern Kansas and some of the other middle western states report conditions as about the same as in Missouri.

Picketed ponies and wigwags seen at Hood River, at strawberry season in former years in every watered cove of the berry districts, have vanished. Indians who come down from Yakima and Warm Springs for strawberry harvest ride in the most modern conveniences. Their automobiles are characterized by their neatness and expensiveness. While squaws and paposes continue to wear the gayest colored shawls obtainable and carry beaded bags that arouse coveted glances from white sisters and the bucks stroll about with their long hair done in plaits, the old wigwag has been discarded for the latest motor camp equip-

ment. Baby Indians do not seem so much in evidence as in former years, but those brought along are rarely seen in any modern go-carts. The redskin mother may ride in an eight-cylinder car, but she clings to the old board and basket baby carrier.

Indians, so those who are here now declare, have prospered mightily the last few years. Most of them own land allotments that have been used for wheat growing. The redskins make no protest when they pay 18 cents per loaf for bread. Comparatively few participate in the berry harvest now. Several years ago Indians, coming here as many as 500 to 1,000 in a season, were the chief berry harvesters. It is likely that not more than 50 are here this season. Some Indians are here merely as tourists. A grower the other day approached a huck and started to dicker for the services of himself and family. He was informed in the best of English that the party whose services he desired was merely on a vacation.

"That's our car," said the Indian man with hauteur, pointing to a handsome eight-cylindered Cadillac.—Hood River Glacier.

What They Are Doing in California

The 1920 cantaloupe acreage in the Imperial Valley is reported to be 22,000 acres as against 14,000 acres in 1919. At the rate of production last year it will require 10,000 cars to move the 1920 crop at the rate of 300 cars per day.

The largest and most modern lemon packing plant and processing plant in California has just been completed at Maxwell, Colusa County. It will handle the greater part of the lemon product of the Sacramento Valley.

A new fruit cannery being built at Santa Rosa when it is completed will be the most modern fruit handling plant in California and will give employment to about 8,000 persons. The new plant will cost \$250,000.

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The office of standardization of the California Department of Agriculture recently caused the arrest of 32 strawberry growers who failed to pack their fruit according to the state's regulations. The court imposed fines varying from \$35 to \$50 on the offending growers.

Strawberry growers in Alameda County are very much concerned over the appearance there of the strawberry root weevil. This pest has become so serious there that the California Department of Agriculture has assigned several of the department's experts to stamp it out. It is claimed by California experts that the infestation was brought into that state by strawberry plants imported from the Northwest several years ago.

California will be one of the few states that will have a bumper peach crop this year. Estimates at the present time place it as being fully as large as it was last year when 2,773 cars were shipped. Optimists estimate the yield at a still higher figure and say that they expect to see 3,000 cars shipped to eastern markets.

Shortage of cans and the high price of sugar it is claimed will result in a short pack of fruit being put up in California this year. According to the statements of canners a pack that will not exceed 75 per cent of the normal output will be put out. Prices for canning fruit are also considerably higher than last year, a condition that canners say will have its influence in limiting the pack. Growers it is reported are asking \$65 to \$100 a ton for peaches, \$110 a ton for peaches and \$100 a ton for apricots.

Cannery Notes

Having leased the building formerly occupied by the Albany Fruit Juice Company at Albany, Oregon, R. V. Foreman and C. E. Pratt will engage in the manufacture of vinegar.

A cannery plant which will be ready for operation August 1 is being constructed at Oroville, Washington. The new plant which is located in the center of a large fruit growing district is largely financed by the business men of Oroville. F. W. Fraser, formerly of Canada, has accepted the position of manager. The main product that will be handled by the cannery this season will be tomatoes, the output of 200 acres having been contracted for with local growers.

The new cannery and drying plant of the F. A. Kurtz company which has been completed at Salem, Oregon, expects to handle a large tonnage of prunes and other fruits this season. The new establishment is a complete two line cannery with a drying room that is said to have one of the largest capacities in the state.

Notwithstanding the light crop of cherries the Libby, McNeil & Libby cannery at Yakima, Washington, expects to can in the neighborhood of 400 tons of cherries this year. The company estimates that to do this it will need 150,000 pounds of sugar and has purchased this amount for its season's run. It is reported that the amount that the company has invested in sugar for its Yakima plant is \$37,000.

The cannery of the Oregon Packing Company at Lewiston, Idaho, the largest in that section was overhauled early in the season and is now engaged in putting up its cherry pack. Although the cherry crop is considerably below normal in the Lewiston district the company has prepared for a busy season in canning cherries and other fruits.

The A. Rupert Company, Inc., which started the erection of a cannery at McMinville, Oregon, this year, announces that the establishment will be ready for operation when the canning season opens. A feature that the Rupert Company has adopted in connection with its canning business at McMinville is that it is furnishing seed to growers of canning products at cost.

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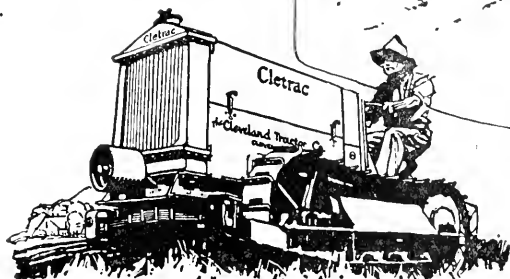
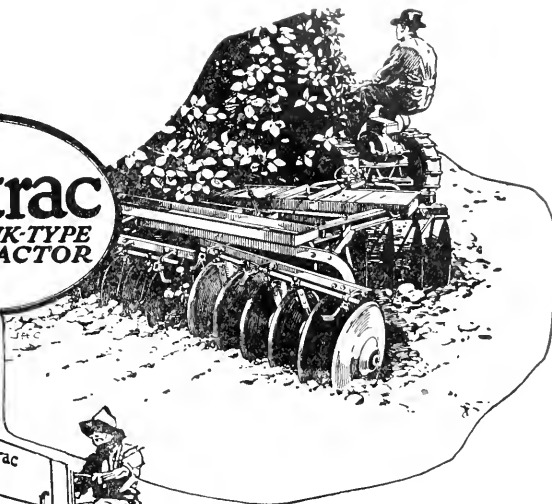
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Competition In Apples.

The announcement of the United States Bureau of Markets that the Northwest box apple industry has expanded from a shipment of 3,722 cars in 1916 to 8,378 cars in 1919 is most encouraging to those who have followed the business from year to year. A very significant point in the marketing of last years' box apple crop also is its much wider distribution. It is shown that whereas a few years ago New York and Chicago were looked upon almost as the beginning and end of the market for box apples, in 1919 large increases in the sales of box fruit took place in 10 of the largest cities in the United States while cities of smaller population, in some instances located in the heart of the barreled apple districts sold large quantities of the box article in direct competition with barreled fruit.

In fact the increase in box apples sales over the period mentioned have been so noticeable that the Bureau of Markets in sizing up the situation says that the consumption of barreled apples seems to be decreasing, as 25,941 cars were marketed in 1916 as compared with 17,798 cars in 1919. While this statement is cheering to the box apple grower and handler we believe it ought to be discounted a little on account of the smaller barrel apple crop last year. The main point, however, is that the demand for box apples has grown wonderfully and is very evidently due to grow still more by concerted action in making not only the excellence of the fruit but the package itself known in every section of the country. Many persons will buy a box or a basket containing a bushel of apples that will not or cannot buy the cumbersome quantity of a barrel.

In this connection the statement of a well known eastern horticultural writer made several years ago is interesting. In writing of box apple competition with barreled apples he remarked: "How about the competition of the famous orchard sections of the great west, middle west and Pacific Coast. For myself I have no fears of serious competition from western fruit growers, enterprising as they are, when I consider that it costs about \$300 to ship by freight a carload of apples across the continent, whereas the fruit growers of New York, Pennsylvania and Massachusetts may ship a carload of fruit to New York, Boston, or Philadelphia for from \$25.00 to \$40.00 per car."

And yet despite this handicap in the way of freight charges the demand for the box apple is growing and growers in some of the districts in the states mentioned in the foregoing paragraph have adopted the box pack. With the

proper methods pursued there is no reason why the entire output of Northwestern apples cannot be disposed of on a permanently profitable basis, no matter what the competition may be against them.

The "Come Back" of the Prune.

The question is frequently asked, "has the prune industry come back to stay?" Perhaps the best answer to this query can be found in the recent statement of the California Prune and Apricot Growers' Association that on May 15th the association notified its brokers that a limited quantity of the new crop of prunes would be booked at the association's prices. Within 24 hours the association had received orders for so many carloads of prunes that it had to withdraw its offer fearing that it would not be able to fill them.

This is interesting news to prune growers generally and particularly to prune growers of the Northwest as no phase of fruit growing has had so many ups and downs in this region as prune growing. When the prune growing industry sprang into prominence in the Northwest the demand was strong and prices were good, due to the limited supply. Profitable prices caused the planting of many prune orchards with the result that the supply exceeded the demand and prices fell. As a result hundreds of acres of prunes were grubbed out and set to other fruits. Later the demand for prunes was renewed and has continued almost without interruption since. During the last three years prunes have been big money makers and indications are that they will continue to be.

In the early days of the industry prunes, like other fruits, were marketed by haphazard methods. Now they are being sold on a business basis. Marketing organizations that insure a wide distribution and the advertising of the product have taken hold of the game. The product is being put up into attractive packages of various weights and prunes are taking their place in every household along with the other fruits.

Therefore the prune has come back and evidently come back to stay.

Getting Cars.

Realizing that the car shortage will not be adjusted without considerable pressure and that the time to try and avert it is several months before the time to commence the heaviest shipping of fruit the Yakima Traffic and Credit Association representing Yakima shippers and the Yakima Commercial Club, representing the business interests of that section have entered on a campaign to secure as many cars as this district needs. To carry on this movement and also to keep up the fight against the proposed increase in freight rates on apples amounting to almost 21 per cent a fund of \$15,000 has been raised.

As other fruitgrowing districts are in the same position as Yakima they would do well to form a similar organization for a similar purpose. By start-

ing a movement to secure cars now something should be accomplished when they are most needed. A presentation of the needs of each district to the railroad companies far in advance of the shipping season would at least be a great help in allowing them time to apportion the cars as equitably as possible.

What the Papers Interested In Fruit Are Saying.

Another sure way to increase production and speed the back-to-the-farm movement would be to place the burden of taxation on idle lands held by speculators and sportsmen instead of upon cultivated lands and farm improvements; to equalize freight rates on farm products; to open and develop new water-shipping routes and to extend the Farm Loan system so as to make it easier to borrow money and own farms than it is now.—*Fruit Trade Journal*.

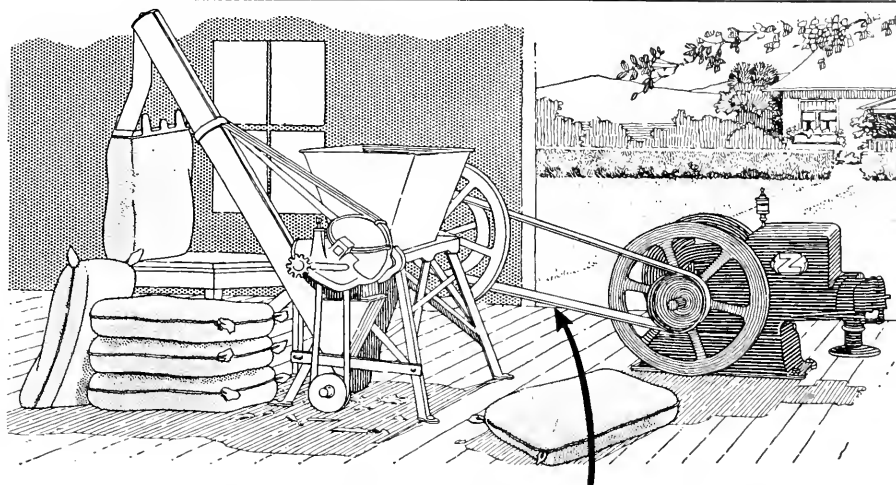
Ye Editor in a grocery store in San Jose bought a pound of prunes for just 30 cents the other day. The weight was accurate, and there were 53 prunes in the pound. They were good prunes. They had not been processed, and presumably were bought direct from some grower. The association's opening selling price for that size in bulk was a fraction over 13 and one-quarter cents. If he paid 15 cents he is making 100 per cent as his gross profit. He is getting more for handling that pound of prunes than the average grower got for producing and delivering its kind to the packing house.—*Sunsweet Standard*.

Believing that more complete pollination of apple blossoms would strengthen the set of the fruit, W. B. Armstrong, L. J. Shadholt and a number of neighbors in the Lower Naches this spring rented 150 stands of bees from an apiarist and placed them at central points in the orchards. Just before the early spray the owner of the bees was notified, and removed them. "I am not prepared to say," says Mr. Armstrong, "that the result will increase our crop by any definite percentage. But the indications are that through the whole district, the set of fruit is stronger, and the drop less, than it has been in previous seasons. In fact it looks as if we would get a real crop this year. We think enough of the results so we are planning to make a similar arrangement next year."—*Big Y Bulletin, Yakima*.

New York state fruit growers are unquestionably becoming interested in the matter of auto truck trailers. Men who say they are qualified to speak for the trailer industry, make the positive statement that auto trucks may have their capacity doubled by the use of trailers with only the expense of 10 per cent more gasoline and a lessening of the ordinary speed by only 10 per cent, as well. If these statements are correct,—and there is no substantial reason for questioning them,—then the fruit grower who has an auto truck or is contemplating purchasing one for the convenient and expeditious transportation of his perishable products, might well give serious consideration to the additional investment required for a trailer which will accomplish so much at such little additional cost.—*The New York State Fruitgrower*.

Yakima Union Buys Graders

Mechanical apple graders will be used in the Yakima Valley this year on a wider scale than ever before. The Yakima Horticultural Union, which handles thousands of boxes of apples has purchased four graders which will be installed in its various warehouses throughout the valley. Three of these machines are Cutlers of the new improved type, capable of handling a large number of boxes per day and one of them is a Price. The graders will be distributed at the points in the valley where the union is handling the greatest tonnage and are expected to greatly facilitate the work of packing out the crop which has heretofore been largely handled by belt graders.



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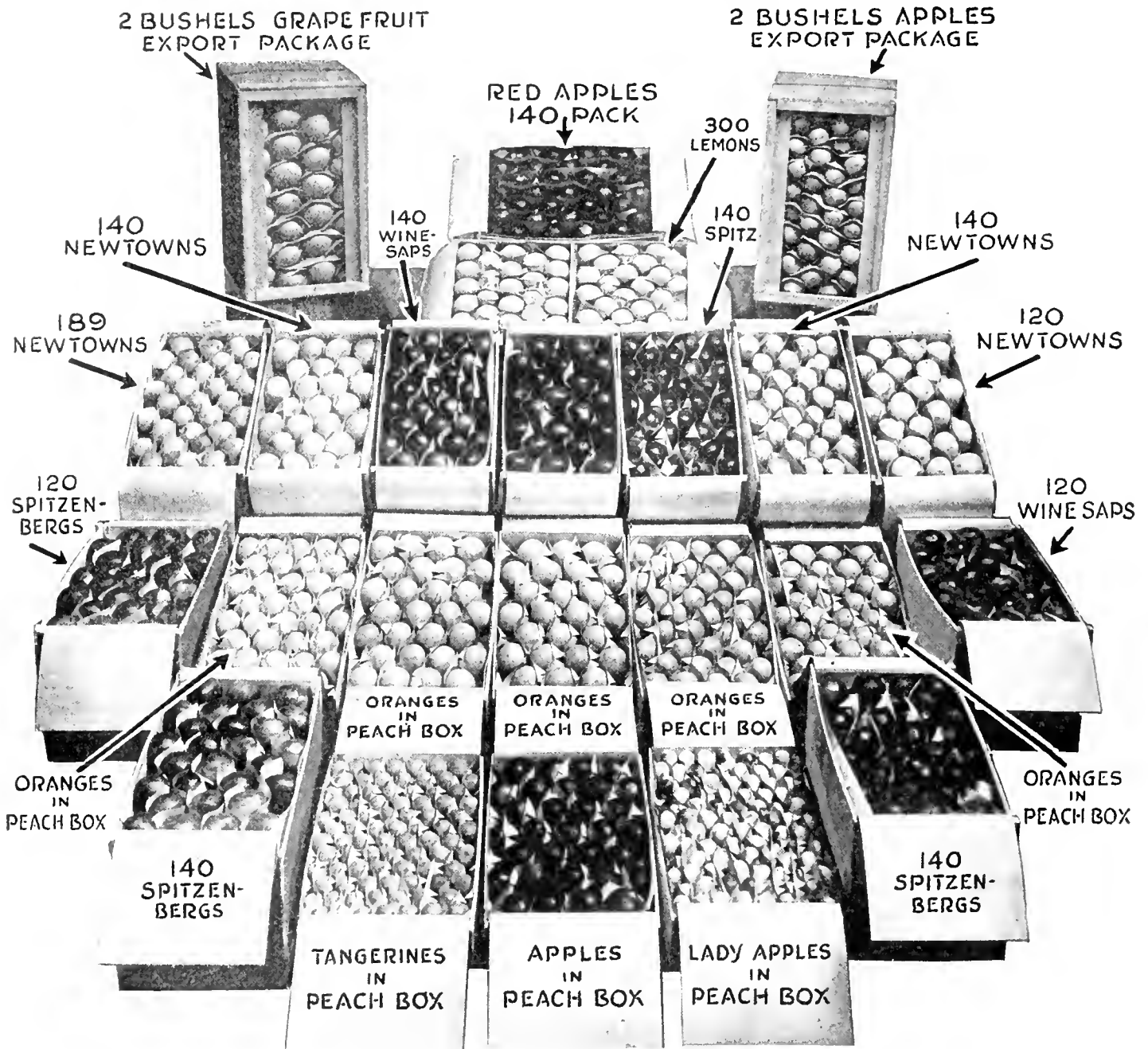
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Northwest Fruit Notes from Here and There

OREGON

Owing to the shortage of lumber and box materials, H. F. Davidson, who owns a large fruit ranch at Hood River and also a farm near Lebanon, Oregon, will construct a saw-mill near the latter place with a capacity of 20,000 feet daily to work up a tract of fir trees on his Lebanon property.

The first full carload of strawberries to be shipped out of the Hood River Valley this year brought \$4.00 per crate. This is said to be a record price for a carload shipment. The berries were shipped by the Hood River Apple Growers' Association. Strawberry pickers in the Hood River Valley are reported to have earned as high as \$7.50 per day this year. Canning berries from this district brought high prices and in addition to the fruit that was taken by the local cannery a considerable quantity of berries were shipped to canneries in Portland by motor truck. The cherry crop at Hood River is reported to be light with prices ruling high. Most of the Royal Annes and other light colored cherries were taken by the canners while the black varieties were shipped out fresh.

The Phez Company at Salem, which has created a big demand for its various berry and other fruit products through a wide campaign of advertising has increased its capital stock from \$1,000,000 to \$1,500,000. Expansion of the company's business is given as the reason for the need for larger capitalization. The company recently sold 15,000 cases of jellies and jams to one firm. The shipment went to South Carolina. Up to the present time the Phez company which has made a specialty of manufacturing loganberry juice has not determined how much juice it will put up this year, owing to the high price of the berries and the light crop. The demand for the juice had been so great up to the middle of June that the company's stock of this beverage was reported to have been exhausted.

The announcement is made that Dufur will have a box factory. It was expected to have the factory in operation the latter part of June. The box factory will be operated in connection with two saw mills which will be erected at that place by the Phillips Lumber Company.

According to the program outlined by the Kings Products Company, its output of dried fruits and vegetables for the 1920 season will total \$2,000,000. Officers of the company report an advance sale of this amount of its products for the coming season.

The Suncrest orchard at Medford, consisting of 461 acres, and planted to good commercial varieties of apples and pears, has been sold to Jones Brothers, canners and packers. The orchard was formerly the property of Dr. C. F. Page, but at the time of its sale was owned by the Mutual Life Insurance Company. It is said that the new owners who operate packing plants at Boston, Massachusetts, and at various points in the Northwest will erect a plant at Medford. The price paid for the orchard was \$275,000.

A good deal of hesitancy is reported to be shown by Oregon prune packing corporations in announcing an opening price for prunes. This condition is said to be due to a number of conditions including the labor situation, which is causing prune handlers to be careful in sizing up the market for prunes and in announcing prices that they feel will handle all the crop to an advantage. Growers believe that the situation warrants a high price while buyers are anxious to get more information about local and foreign markets before fixing the first quotations.

Polk County cherry growers who pooled their product, amounting to about 200 tons, are announced to have sold their cherry tonnage to an outside buyer. Although the growers state that the prices received were satisfactory they have refused to announce them to the public. At the time of selling their crop growers fixed the picking prices for cherries which was placed at two cents a pound, with a bonus of a quarter of a cent per pound to pickers who remained until the crop was harvested. Cherry picking in this section commenced about the latter part of June.

The average price for loganberries and cherries at the end of the contract season in Marion County is stated to have been about 12 cents, although it has been difficult to obtain figures giving the exact amount. In referring to the loganberry price situation the Salem States-

man says: "Several pools have recently been sold at good prices according to reports. The Bruce Cunningham holding of about 200 tons has been disposed of at 13 cents. Other parcels of 75 and 100 tons have been disposed of, according to reliable reports, for the price of 13½ cents. Mr. Cunningham stated recently that the formation of the Marion berry pool was instrumental in raising the present price of berries. This is favorable to the small grower. He further asserts that he had personally offered 14 cents for his crop of berries but that he ignored the offer because it did not consider the interest of the small growers who are members of the pool. However, Mr. Cunningham claims that the members of the pool were forced to accept a price less than the 14 cents because of the sugar situation which he claims was utilized by buyers in breaking the lower figure. Regardless of this fall in price, some local buyers claim that the prices of 12 and 13 cents are the highest average scales ever attained in Oregon."

In organizing its marketing force for the coming season the Oregon Growers' Cooperative Association has secured the services of three men well known in the fruit industry of the Northwest. To manage the Medford and Grants Pass branches of the association, one of the most important, C. C. Lemmon, formerly of Hood River and later of Yakima, has been chosen. Mr. Lemmon has had a wide experience with various fruit shipping organizations in Oregon and Washington and comes to the association from the Perham Fruit Company at Yakima. The local affairs of the association in the Dallas-Monmouth district

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will be under the direction of Charles E. Bamp of Salem, Mr. Bamp is a native of the Willamette Valley. At one time he was employed by the Salem Fruit Union and for two years was connected with the Mason-Ehrman Company. J. H. Frazier, a Portland man, has accepted the position of traffic manager and assistant sales manager. Mr. Frazier occupied the position of traffic manager with the Pacific Fruit and Produce Company and previous to that was connected with the traffic departments of several of the large railroads.

WASHINGTON

A recent survey of the apple orchards in the Yakima Valley indicates that the output of apples in that district this year will be very materially reduced. Estimates now are to the effect that the shipment from there will be 2,000 carloads less than in 1919. The falling off in the output is said to be due principally to the freezing of the trees during the severe cold weather last winter.

M. L. Dean, chief of the Washington Division of Horticulture, announces that the summer meeting of Washington State Horticultural Society will be held at Wenatchee, July 14, 15 and 16. A feature of the meeting will be visits to the orchards in the vicinity of Wenatchee and Cashmere to examine the results of experiments which have been made with commercial fertilizers. Codling moth control work will be demonstrated and other orchard problems studied.

R. S. Hasbrouck, a rancher near Aberdeen, Washington, who already has 39 acres under cultivation in Clarke County for 15 years, is planning to 70 acres, making one of the largest individual berry farms in the state of Washington. Mr. Hasbrouck who believes in diversifying in small fruits, is setting out blackberries, strawberries, loganberries and raspberries.

According to a report from the Puyallup district pickers this year received 65 cents a crate for picking raspberries for shipment and 75 cents a crate for picking cherries. This incentive to get pickers to remain throughout the season a bonus of 10 cents per crate was also paid. These prices for picking berries were 10 cents a crate higher than those paid last year at the opening of the season, although higher prices were paid before the berry harvest was over to save the fruit. The prices for crates was 27 to 29 cents.

Pruce buyers who have been attempting to buy fruit in Clarke County for 15 years are reported to have had but little success. Few growers agreeing to sign up. Before the end of the buying season in Clarke County last year prunes sold on the tree for as high as 20 cents per pound. Growers believe that the opening prices offered this year indicate that higher prices will be paid than last year.

Chelan County, one of the best known and largest fruit raising districts in Washington, is said to lead the Northwest in the number of motor vehicles owned in proportion to the population. Figures taken from the county auditor's office show that with a population of 20,000 people, that Chelan county has 5,000 motor vehicles. This is said to be a higher number per capita than California, which state heretofore has been given the credit for having more motor cars than any section of the Pacific Northwest.

The strawberry season at Kennewick, Washington, which has closed, resulted in the marketing of 18,000 crates of berries by the growers' union in that district. The berry season at Kennewick was highly successful. The berry season closed with berries selling at 86 per crate and high prices were maintained throughout the season. The crop, which was almost entirely handled by the union was shipped out in better condition than in any previous season, owing to the installation of a refrigerating plant in which the berries were pre-cooled before being placed in the cars.

Frost damage in the Spokane Valley is estimated to have been remarkably low this year. Managers of fruit associations and growers in that district who have been checking up on the matter place the damage at about 10 per cent for all orchards. Most of the orchards affected were situated in low spots. Smudging in the Deer Park and some of the other sections where the temperature dropped as low as 22 degrees resulted in the saving of a number of crops.

The establishing of a wholesale fruit, vegetable and imported edibles concern at a cost of approximately \$25,000 will be undertaken

by Benny Caputo & Co., a Spokane fruit firm, according to Joe Luca, one of the members of the firm. "We are going to start a big wholesale business in fruit, vegetables and imported goods from South America," said Mr. Luca. "We will start remodeling the building on our new site July 15 and will open for business by August 1 or sooner." Part of the capital for the new venture is being placed by Albert Caputo, a relative of Benny Caputo, and now living in Italy.

The apple crop of the Spokane district will be 20 per cent greater than last year's crop, according to C. J. Webb, assistant manager of the Spokane Fruit Growers' Company. "I would say that the Spokane district apple crop will be between 1500 and 1700 cars this year," said Mr. Webb. "The greater production is due to a general increase of crops in every section of the district. Contrary to the estimate includes Four Lakes, Davenport, Creston, the Arcadia Orchards, Stevens County apple growing sections, such as Meyers Falls, and Kettle Falls, the Coeur d'Alenes, Moran, Waverly and Fairfield."

H. A. Glen, general agent of the Northern Pacific, has issued his annual estimate of the 1920 fruit crop from the Yakima Valley. Mr. Glen's estimates in the past have been practically correct. His figures for this year will be the chief shipping center, with Selah second, Buena third, and Grandview fourth. He anticipates a material reduction in peaches. The carload estimate, with 1920 given first and the 1919 record second is: Peaches, 177,220; pears, 1234,200; apples, 12,930,14,000; melons, 425,400; mixed, 585,430; cherries, 200,75; strawberries, 30,30.

District Inspector P. S. Darlington has completed his first tentative estimate of the fruit crop of the Wenatchee district for 1920. He estimates the total crop at 11,850 carloads as compared with 12,150 carloads last year. The crop last year exceeded all estimates by a large margin, and with favorable conditions prevailing it may be the same this year. Every section of the district will show an increase except Wenatchee and vicinity. Here, Mr. Darlington estimates a crop of only 2500 cars as compared with 3335 cars last year. The marked shortage in Jonathans and Rome Beauties accounts for the heavy decline.

Cashmere, Dryden, Peshastin, Manson, Chelan, Omak, and Okanogan are said to promise a decided increase over last year's fruit yield. Cashmere is credited with a probable output of 2,000 cars, against 1392 last year. Omak should ship 1,000 cars instead of 663 last year. Okanogan is estimated at 450 cars against 330 last year. Malott should ship 200 cars against 125 last year.

District Horticultural Inspector E. G. Wood states that the apple yield in Walla Walla district will be approximately 40 per cent of normal. Some parts of the district will have nearly a normal crop while others are hard hit.

A number of Yakima apple growers, who have large quantities of apples to pack out have organized the Bede Lumber Company for the purpose of manufacturing boxes and will establish their plant in Portland, Oregon. The plant, which will be located in the Kenton district, will have a capacity of 12,000 boxes per day. Work has been started on its construction and active operation in turning out boxes will be commenced shortly.

The latest recognition accorded to one of the Northwest's most famous fruit trademarks is in a half page advertisement in the Saturday Evening Post by the Leo Feist Company of New York, announcing the publication of a new Indian novelty song hit entitled "Skookum." The Feist Publishing Company is one of the largest New York song producers, and they announce that they expect at least a million citations of the "Skookum" song. In addition to sheet music the music has been adapted to talking machine records and player piano rolls. The title page of the song shows in large size the well known smiling Skookum character and the words "By Permission of Skookum Apples."

To protest against proposed increases in express rates as applied to shipments of fruit from the Northwest, the North Pacific Fruit League has represented the horticulturists of the Examiner Barclay of the Interstate Commerce Commission in Spokane. The special committee from the league included Paul H. Weyrauch of Walla Walla, C. W. Metcalf of the Kootenai River and A. J. Webb of Spokane. Increases suggested range from 25 per cent to 100 per cent.

IDAHO

According to the Bureau of Plant Industry of the Idaho Agricultural Department, the fruit acreage in that state is now estimated at 65,000 acres. Of the total acreage 45,000 acres are in apples, 15,000 acres in prunes and 5,000 acres in peaches, cherries and pears. It is estimated that about 20 per cent of the entire acreage is in full bearing, 60 per cent in light bearing and 20 per cent not in bearing. Approximately 45,000 acres of the total acreage planted is located in Southern Idaho and 20,000 acres in Northern Idaho. The total fruit production in the state in 1919 is placed at 4,956 cars. Of this output 4,000 cars were apples, 500 cars were prunes, 350 cars peaches, 100 cars cherries and 6 cars pears. The estimated commercial fruit production in Idaho for 1920 is placed at 6,656 cars as follows: Apples, 4,769 cars; prunes, 1,818 cars; cherries, 64 cars; peaches, no commercial shipment; pears, 5 cars.

Shipments of Snake River Valley cherries below Lewiston were commenced this year the latter part of June, the season being three weeks later than last year. Buyers were slow in the early part of the season in quoting prices, but it is believed that on account of the scarcity of this fruit generally that growers will receive high prices for their crops. The price received at Lewiston last year was 12 to 13 cents while the canneries paid 8 cents. It is reported that the canneries have offered 12 cents for Royal Annes. The cherry crop in the Lewiston-Clarkston district will be lighter than usual. The peach and apricot crop in the Lewiston section is reported to be a total loss, many trees having been killed by the extreme cold weather during the past winter. Other fruits, however, give promise of fair crops.

Cherry growers in the Lewiston district have adopted an arrangement of pooling their crops, providing for a minimum sale price of 12 cents for Bings and Lamberts. A similar arrangement was carried out by the growers last year and worked out successfully. The Clatsop growers also are organized along the same lines. Shippers have been somewhat concerned over a possible shortage of boxes, although a local factory attained an output of 5,000 boxes a day. One packing firm received a shipment of 275 barrels, in which Royal Anne cherries were shipped, being placed in water charged with a preserving gas.

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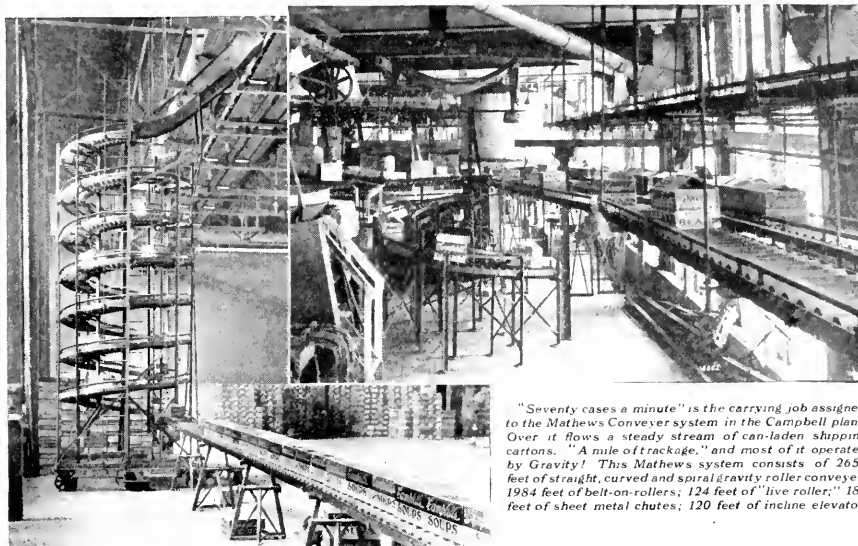
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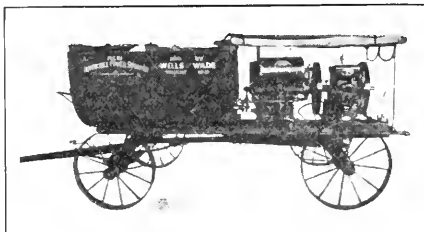
Built to give real service. Made of 12 oz. heavy duck; steel frame at opening shaped to body; canvas fastened to frame and made doubly secure by real leather binding. Straps made of heavy webbing and fastened to frame at points that assure complete rigidity at all times, and that allows the fruit picker absolute freedom of both hands and arms during the complete picking operation. Send for sample today or write or illustrated circular explaining the strong points of the "4W" Picking Bag.

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Note the following features: 1—Extra heavy construction, insuring complete rigidity; fasteners placed on each side and back of press to which wheel or roller conveyor can be instantly attached allowing unlidded and lidded boxes to be disposed of at the will of the pressman.

2—Metal arms and equalizer manufactured in one piece, and are adjustable, instantly, to apple, pear or other sized fruit boxes; equalizer fastens to upright bars of cold rolled shafting.

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In addition to the above mentioned equipment, fruit growers will no doubt be glad to know that we are distributors for Apple Box Elevators, Conveyors, "Parker 5-Run Nail Strippers," Dick Smith Nail Strippers, Clark Box Hatchers, Cooper Paper Needles, Clamp Box Trucks and Conveyors.

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Observations On the Codling Moth in Walnuts

By H. J. Quayle, of the Citrus Experiment Station, Riverside, California
(A partial report of investigations in 1919)

THE codling moth (*Laspeyresia pomonella*) has been known to attack the English or Persian walnut in California since 1909. In that year Mr. S. W. Foster of the United States Department of Agriculture observed it in the vicinity of Concord and published a bulletin on the subject. Five years later the writer received the first specimens from Santa Barbara County, and during the same year also from Orange County. While these seem to be the first actual records, no doubt the insect occurred in walnuts previous to that time.

In 1914 the infestation was very slight, only a fraction of a per cent in a few groves, but since that date there has been a marked increase in the amount of infestation, until in 1918 it suddenly reached the status of a serious pest. The Citrus Experiment Station at once decided to undertake studies looking toward the control of the pest. In the meantime the California Walnut Growers Association, through its manager, Mr. Carlyle Thorpe, realizing the importance of the problem, sponsored a bill which was passed by the California legislature, and which carried a sum of money for the investigation of the problem. This money was appropriated to the State Commission of Horticulture, now the State Department of Agriculture, and through the director, Mr. G. H. Hecke, one-half of the appropriation was generously turned over to the university for investigational work, and one-half retained by Mr. Hecke's office for work in connection with the prevention of spread of the pest.

Codling Moth in Walnuts Elsewhere

The codling moth attacks the walnut in South Africa, where it seems to have taken to the walnut at about the same time that the insect began to attack the walnut in California. Mr. C. W. Mally, entomologist at Cape Town, reports that in certain districts in 1915 as high as from 50 to 60 per cent of the crop was attacked. The codling moth also occurs in walnuts in France, where it has been known to attack the nuts as far back as 1859. It was first described as a distinct species having the scientific name of *carpocapsa putamina*, but later it was considered as a variety of the species *pomonella*, which attacks the apple. In correspondence with Mr. Carl Heinrich, of the Bureau of Entomology at Washington, Mr. Heinrich states that it is his opinion that the insect attacking the walnut in Europe is not a variety, but the same species that occurs in the apple in the United States.

Identity of the Species

A number of experiments were carried out for the purpose of determining how the insect would thrive when transferred from the apple to the walnut, and vice versa. Eggs, small larvae, half-grown larvae, and nearly matured larvae which were secured from the apple were transferred to the walnut, and in all cases the insect went through its development in due course. Like-

wise, different stages of the larvae were taken from the walnut and transferred to the apple with similar results. In cheesecloth cages the insect from the apple deposited eggs equally freely on the apple and walnut which were suspended in the same cage. Similar results were secured where the insects were taken from the walnut. A walnut tree was covered with cheesecloth and cocoons of the codling moth from the apple placed within the cheesecloth covering. Apples were suspended in the walnut tree, some of which were practically in contact with the nuts on the same tree. The moth deposited eggs on the walnuts under these conditions and the insect came to maturity.

From our experiments of the first season, then, the insect may be transferred from one food plant to another without affecting its development.

Under field conditions, however, the insect exercises more discrimination. Where walnut and apple foliage are interwoven, 90 per cent of the apples may be infested with not more than one per cent of the walnuts infested. This would be the situation in the area where the codling moth is known to infest walnuts. Outside of this area, apple and walnut foliage may be in contact without any record of the insect attacking the walnut.

Distribution

At the present time the areas where the codling moth infests walnuts, and where it is an economic problem, is in the vicinity of Santa Ana and Tustin, in the vicinity of Capistrano and Carpinteria. Occasional records of the in-

sect in walnuts have been secured in several other localities. Mr. D. B. Mackie, who is in charge of the prevention of spread of the moth, has records from several localities where it has not yet reached the status of a pest.

Life History

The life history of the codling moth in walnuts is essentially the same as the life history of the same insect in the apple in the same locality. Until the present season it was supposed that the later broods only attacked the walnut.

In 1919 the first eggs were observed on the walnut in Santa Ana on May 8. These were located on the stem of the new wood, a short distance back of the nut, and also on the leaves. Like the apple, the walnut in the early stages has a fuzzy surface, which is not suitable for egg laying. The first larvae appeared during the second week in May and continued to appear until the middle of July. The first brood of moths began to emerge on June 28 and continued until the last of August. The second brood of eggs was first observed July 7 and continued to appear until the first of September. Larvae of the second brood began to appear about the middle of July, the maximum numbers occurring the last of July and the first of August. A third brood appeared later and larvae were observed to enter the nuts up to the first of October.

The data as given are for the Santa Ana district. At Carpinteria, the life history is very different since the insect is three or four weeks later in making its appearance. The maximum number of larvae entered nuts in that section last year about the middle of July, and these were larvae of the first brood instead of the second brood, as at Santa Ana. The difference in temper-

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ature between Carpinteria and Santa Ana, while not very great, accounts for the difference in life history.

Feeding Habits

Many of the larvae that appear early in the spring enter the nut at the calyx end, but after the nuts attain some size and are large enough to come into more or less contact, protection is afforded at this point, and for the remainder of the season most larvae enter where two nuts are in contact. The nuts that are attacked early in the season, while they are still immature, fall to the ground, and these are not accounted for at harvest time. Up to the middle of July the larvae as a rule bore directly toward the center of the nut. Up to this time the shell has not hardened to any extent. From the middle of July on, however, the shell is so hard that the larvae can not make their way through the shell, and the only place they can enter the nut is through the suture at the base. They may enter the husk where two nuts are in contact as usual, but when the shell is reached they bore along the shell more or less at random. The majority of them sooner or later find the suture, where they enter and feed on the meat of the nut. Some that do not find the suture may complete their development in the husk of the nut alone.

Control

The control of the codling moth in walnuts must necessarily follow in general the methods that have been determined upon, after extensive investigation, in the case of the same insect in the apple. There are certain differences and difficulties, however, in the case of the walnut. The large size of the walnut trees presents greater difficulty in reaching all parts. There is no calyx cup to fill, as in the apple, and it is also necessary to get the poison where two nuts are in contact.

Banding

Burlap bands placed around the tree trunk serve as a place where larvae repair to undergo pupation. While some of the worms enter here, there is not a sufficient number to afford satisfactory commercial control. Since after the first month or so the worms enter the band almost continuously it is necessary that the bands be removed and insects beneath killed, in order for the bands to be effective. To avoid the trouble of attending to the bands every couple of weeks the improved band, which was first used by E. H. Siegler in Colorado, was used. This consists of the ordinary burlap band, over which is placed twelve-mesh mosquito wire netting. This sort of a band allows the worms to enter through the meshes of the screen when they go under the burlap band to spin their cocoons as usual, but when the moth emerges it is unable to make its way out through the screen through which the larva entered. Hence such a band serves as a permanent trap. While these bands check a few of the insects there still may be a heavy percentage of infestation on the same tree.

Spraying

Spraying is the method of control generally relied upon for the codling moth in the apple and it proved to be satisfactory the past year in the control of the same insect in the walnut. A considerable amount of spray material is necessary to cover a tree, and this would seem to be a serious objection to spraying. An average sized walnut tree will require 25 gallons of spray to cover it thoroughly. The largest trees may require as much as 35 gallons. Good sized apple trees may be covered with eight or ten gallons, but the tree basis is not the proper way to make the comparison. While the walnut tree requires much more material there are fewer trees to the acre, so that on an acre basis there is not much difference between the amount of material needed for walnut and apple spraying. If a walnut tree requires 25 gallons and there are 20 trees to the acre, the amount of spray material per acre will be 500 gallons. If an apple tree requires eight gallons of spray and there are 60 trees to the acre the amount of material per acre will be 480 gallons.

Dusting

A large acreage was dusted during the past season (1919) for the codling moth, that is, arsenate of lead was applied dry rather than being mixed with water and used as a liquid. The dry material has been used with success in some sections on the apple. Dusting in the Santa Ana and Carpinteria sections has resulted in a considerable reduction of wormy nuts. The chief objection during the past year was due probably to lack of thoroughness in covering the tree. While the aphid is readily killed by the dust, in the case of the codling moth it is necessary to have the arsenical on every nut on the tree for good control. Another objection to the kind of dust that was used last year was the injury that resulted to the tree. The walnut tree is very susceptible to injury by spray materials, and hence only the most neutral materials can be used with safety.

Fortunately the objection of injury to the tree may be easily and completely overcome by using basic or neutral arsenate of lead, rather than the standard or acid arsenate of lead that was generally used during 1919. Where the writer employed the liquid spray, basic arsenate of lead was used with no injury whatever. Some of the second applications of dust also consisted of this material and no injury was done. Basic arsenate of lead is not as powerful a poison as the acid arsenate, hence is slower acting on the larvae. In the case of the walnut, however, if the poison kills the larvae eventually it would be satisfactory, because a small burrow in the husk alone will not affect the nut, whereas the same injury would mar the apple.

Time of Application

Based upon life-history studies of the codling moth in the walnut conducted last year, the first application should be made during the last week of May and the first week or two of June. The

second application should be made about July 15. These dates are just previous to the time when the maximum number of larvae of the two important broods enter the nuts. This applies to the Santa Ana district. At Carpinteria the time of appearance of the broods is strikingly different from that at Santa Ana. At Santa Ana the greatest injury is done by the summer brood in July and August, while at Carpinteria most injury is done by the spring brood in the latter half of July. There is, therefore, practically a full brood less at Carpinteria, and on this account one application ought to be sufficient. The time for making this application at Carpinteria would be the latter part of June or the first part of July.

Results of Dusting, 1919

A very complete survey of the area infested with the walnut codling moth was made as the nuts were harvested at Santa Ana, and also at Carpinteria. More than 200,000 nuts, representing some 5,000 pounds, were separately examined. Counts were made with each pick in most cases, and a reliable figure representing the percentage of infestation was secured from over 100 orchards, about one-half of which were dusted and one-half were not dusted.

TABLE I.—SURVEY OF SANTA ANA AREA.

	Per cent wormy
General average all orchards dusted....	4.73
General average orchards not dusted....	6.33
Highest pct. in single orchard dusted....	10
Highest pct. single orchard not dusted....	21.9
Lowest pct. single orchard dusted....	.8
Lowest pct. single orchard not dusted....	.33

TABLE II.—SURVEY OF CARPINTERIA AREA

General average orchards dusted.....	4.2
General average orchards not dusted....	9.7
Highest pct. single orchard dusted.....	6.6
Highest pct. single orchard not dusted....	15.8
Lowest pct. single orchard dusted....	.7
Lowest pct. single orchard not dusted....	.8

Referring to the figures given in Tables I and II, it is assumed that most of the heavily infested orchards were dusted. That was the case at least at Carpinteria. One orchard well toward the center of the infested area in that section, however, was left untreated and another not treated until very late. These two orchards, only, furnish the figures "9.7," for "not dusted," under Carpinteria. If counts were made just outside the infested district at Carpinteria they would show practically no infestation, whether dusted or not.

At Santa Ana, however, many orchards were not dusted that were distributed among the dusted orchards and were in general area of infestation. Approximately an equal number of determinations was made also between dusted and not dusted orchards, so that the figures should be fairly reliable.

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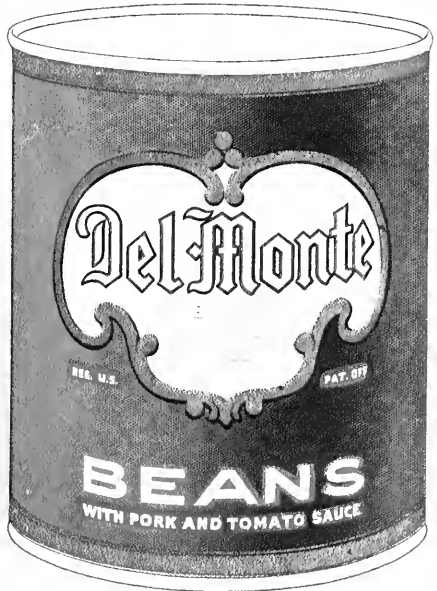
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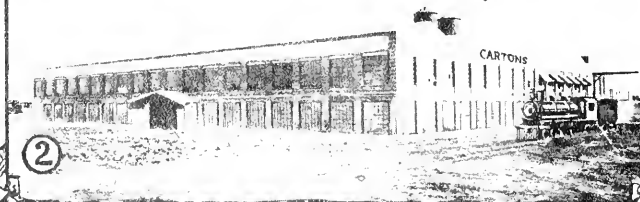
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Filbert Culture in County of Kent, England

By A. A. Quarnberg, Vancouver, Washington

LAST summer I made a trip to England for the purpose of studying filbert culture in a country where filberts have been successfully cultivated for centuries. The county of Kent, situated in the southeastern portion of the country is the principal filbert producing section of England, especially in the vicinity of Maidstone in the Medway Valley. In this country thousands of acres of land are devoted to filbert culture. I very much enjoyed my little daily excursions into the many different vigorous and systematically trained and pruned filbert orchards. These excursions gave me the opportunity and pleasure of meeting a number of the most prominent and successful growers and of discussing with them the various phases of filbert culture. Thereby I gained much valuable information concerning the practices in vogue.

The county of Kent has a mild and genial climate, much like that of the Pacific Northwest. The surface of the country is rolling. The soil is a gravelly loam with some chalk; it is generally well drained and fertile.

Judging from the flourishing condition of the vegetation generally, the climatic conditions seem to be favorable for the growing of filberts as well as other fruit common to that region.

In Kent, the filbert or cob nut is to a great extent grown in alternate rows with other species of fruit, such as apples, pears, and plums; the filbert trees usually being planted from 24 to 30 feet each way, making the distance between the trees in the mixed orchard from 12 to 15 feet apart. In these mixed orchards the filbert trees are pruned low and not allowed to grow more than six feet in height, while the other fruit trees are headed high and trained to a position above the low headed filbert trees. Often the apples, pears and plums form a dense cover over the cob nuts and yet the latter were said to bear well, though not so abundantly as in more open spaces.

In some of the older orchards, many of the standard fruit trees had died of old age and the cob nut trees occupied all the space. In such cases the filberts frequently had a spread of over 20 feet across the top, but still they were not allowed to grow over the standard six feet in height.

In favor of the mixed orchard it was claimed that the filberts and cob nuts would withstand considerable shade from other fruit trees and that generally some kind of a crop from the different varieties of fruit could reasonably be expected every year, so that by this method the land would produce a more regular income than when planted to filberts alone. Such was the case in 1919, when the cob nuts and filberts had a short crop while there was a good crop of cherries, apples, pears, plums, etc.

Cob nut and filbert trees planted alone in orchard form were usually set 12 to 20 feet apart, or somewhat closer than when interplanted with other fruit trees.

In spite of an occasional failure or short crop the Kent filbert growers seemed to have full confidence in the industry, claiming that the cob nuts and filberts, on the average, paid as well as fruit grown there, and, in my judgment, Kent certainly is a good fruit section.

While the filbert trees naturally did best on good land, it was claimed that the cob nuts and filberts were less exacting as to soil and that they would succeed on land quite unprofitable for various kinds of fruit. It was also said that rich and wet soils were expected to produce much wood and yet frequently yield less nuts.

The variety of filbert most largely grown in Kent is the so-called Kentish cob, or Lambert, a variety with long husk and shape much resembling our Du Chilly, but probably a different strain of that type of nut. Regarding filbert and cob nuts, I will quote what a technical Kent filbert man says: "The old distinction between filberts and cob nuts was that the first-named had long husks or full beards, closing over the nuts, and the cob only a short one plainly showing the nut." This distinction has not been accurately retained and the Kentish cob is by that definition truly a filbert, but in Kent all the short-husked nuts are generally known as filberts and the long-husked nuts as cob nuts.

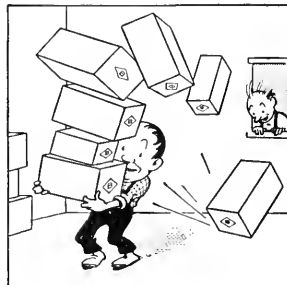
The Kentish cob is placed in the front rank of the so-called market nuts because it is a large, attractive and good-flavored dessert nut, and the tree is a strong grower with great bearing qualities.

There are quite a number of other varieties of filberts grown in Kent, but of the short-husked and roundish shaped nuts there were none which in my opinion, in all-round good qualities

would compare with our Pacific Northwest grown Barcelona. But whether the Kentish cob, the chief nut in Kent, on the average, is a better nut than our Northwest Du Chilly, I am not prepared to say.

Concerning the question of pollination of the filbert, so important to us, I did not learn much in Kent, mainly because our own chief varieties, such as Du Chilly and Barcelona, are not grown there, and besides the growers generally did not seem to have the matter of filbert pollination fully systematized. Any imperfection in this respect may partly be explained by the circumstance that the Kentish cob, the variety chiefly grown there, to a great extent appears to be self-fertile, at least that seems to be the indication from the fact that large blocks of Kentish cob trees planted without any special provisions for cross-pollination, were said to be very productive. On the other hand one of the best authorities on filberts recommends the planting of one Cosford cob to every 25 trees of Kentish cob to insure good fertilization. The Cosford was said to be a better producer of catkins than the Kentish cob and itself a thin-shelled, good flavored nut. Another variety known as the Red Barcelona, and an enormous producer of catkins, was also reported to be used as a pollinizer, but its nuts were said to be small and of little commercial value.

A point considered of the greatest importance in connection with the cultivation of the filbert in Kent is the pruning of the trees. To see and study the close and systematic pruning of the filbert tree and its results was the main object of my visit. And now after having visited and examined a number of the Kent filbert orchards, it is my opinion that the thorough and systematic pruning which the growers are giving their trees undoubt-



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edly is a strong factor in the success made of filbert culture there. By the thorough methods of pruning all the bearing wood of the trees is practically renewed every few years and the life and bearing period of the trees are prolonged almost indefinitely.

In the Beadle Brothers' orchard, near the city of Maidstone, I saw one of the oldest cob nut trees in the county. Its main stem was between two and three feet in diameter, one foot above ground, and the tree although more than 150 years old still appeared to be as strong and healthy as the surrounding trees fully 100 years younger.

I found the filbert growers nearly all agreed on the basin-shaped form of tree on a single stem from one to one and one-half feet high as the best for all purposes. Concerning the training and forming of the basin shape tree, W. F. Emptage, horticultural adviser and specialist, gives the following directions:

The newly planted trees are allowed to go without pruning one year, or until they are well established. The single stem is then cut back to a height of 12 to 15 inches to cause it to throw out shoots from the head to form the future tree. Four or five healthy strong shoots are allowed to grow, which in good ground they do rapidly. During the following winter the shoots are spread apart carefully and held in the form of a basin by a wooden hoop placed between the branches. These shoots are tied out around the hoop at equal distances and headed back in such a way that the terminal buds open outwards. These shoots are then allowed to grow and to put out new branches until about the fourth year when there will be 12 to 15 branches. The heads are kept broad, spreading and open by tying out the branches to stakes set in the ground, or otherwise, in order to get them into perfect shape. From these branches a set of spurs or shoots is given off on which the nuts are produced. To cause them to push out such spurs along their whole length, the main branches must be headed back more or less at every winter pruning.

According to E. A. Bunyard, one of the best authorities on filbert culture in Kent, after the base of the tree has been shaped to the proper form, pruning consists of breaking out the strong suckers which grow up in the center of the tree, cutting the strong leading shoots back, thinning the spurs, removing old wood, etc., the side shoots being best thinned after the flowers appear and the catkins have remained long enough to fertilize the pistillate flowers. And if time permits in July and August it was said that it was a great help to the strength of the tree to break the stronger shoots off the upper boughs with the finger and thumb. This operation plumps up the buds below the fracture and assists in ripening the wood. This method is found better than cutting as the broken surface allows some sap to exude, and tends to prevent the formation of secondary growth, which would weaken the tree, and be of no value in producing nuts. In winter

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pruning these broken ends are smoothly severed with a sharp knife or shears; and the pruner should so manage that there will always be an abundance of good young wood in the tree for fruiting purposes. When a twig shows signs of age the grower should prune so that a fresh young one will succeed it in the next year's cutting, so that worn-out twigs will never be seen in old trees. The trees should be so managed that at the end of 100 years they should be from 15 to 20 feet across the top but not higher than six feet from the ground.

It was also said that some fine nuts were produced on trees of pyramid form, 10 to 12 feet high, which have their spurs shortened, thinned, etc., in the same way as the basin-formed trees, gaining a few inches of upward extension annually.

The Kent filbert growers generally were well agreed on the necessity and great benefits of close and systematic pruning both for quality of nuts and for yield.

Filbert orchards in Kent are kept in good state of culture mainly by hand cultivation, such as forking, hoeing, etc. Some growers claimed that on account of the shallow feeding habits of the filbert tree, plowing would damage the roots. However that may be, the low-headed, spreading trees and the crowded condition of the orchards generally made the ordinary methods of cultivation hardly practicable or very inconvenient to say the least. Suckers were cleared out wherever they appeared.

I was told that the Kent filbert orchards received a dressing of barnyard manure or other fertilizer whenever required to keep the trees in good bearing condition.

The Kent filbert orchards were comparatively free from disease and insect pests and I did not hear of any filbert blight there.

As to yields, it was said that one ton of filbert nuts has frequently been obtained from one acre, and as high a yield as two and one-half tons per acre has been recorded, but that was very exceptional. The owner of a 300-acre filbert plantation told me that he, in a long run of years, had, in round numbers, harvested from 300,000 to 500,000 pounds of nuts a year, or from 1000 to 1667 pounds per acre. This probably may be taken as a fair estimate of the average yield of the filbert orchards in Kent.

The cob nuts and filberts grown in Kent are cured and sold almost entirely in the husk, and for this purpose it was said that the nuts could be picked somewhat earlier than when husked.

I have briefly described some of the things which I saw and learned concerning filbert culture in Kent. The methods, practices and results obtained in the culture of the filbert there are certainly interesting and should be carefully studied and investigated by us with a view of adopting such of the methods and practices as may be thought beneficial and practical under existing conditions and circumstances in the Pacific Northwest.

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BETTER FRUIT

VOLUME XV

AUGUST, 1920

NUMBER 2



TYPICAL SCENE IN AN OREGON FRUIT GROWING DISTRICT

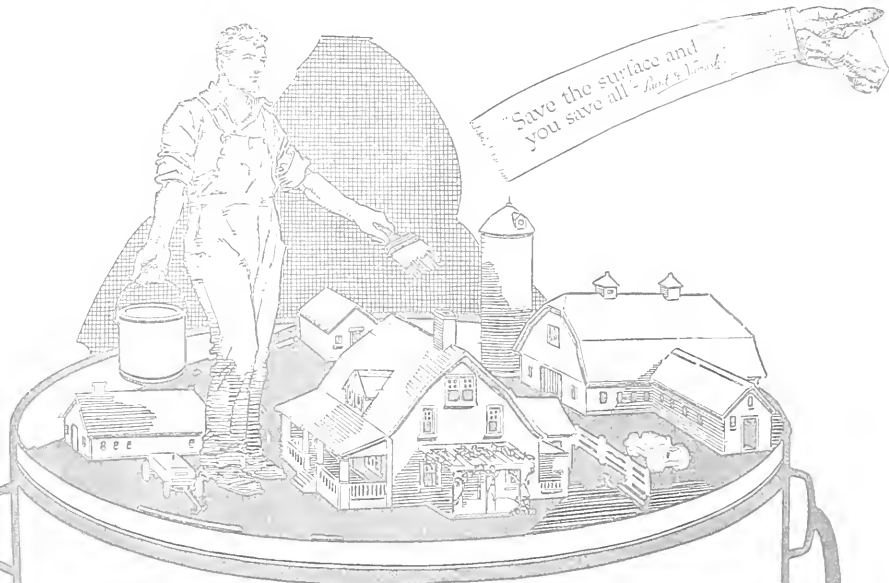
This view which shows Mt. McLoughlin from a point near Medford combines the beautiful and the utilitarian for it is from these snow capped mountains that many of the fruit growing sections of Oregon secure irrigation.

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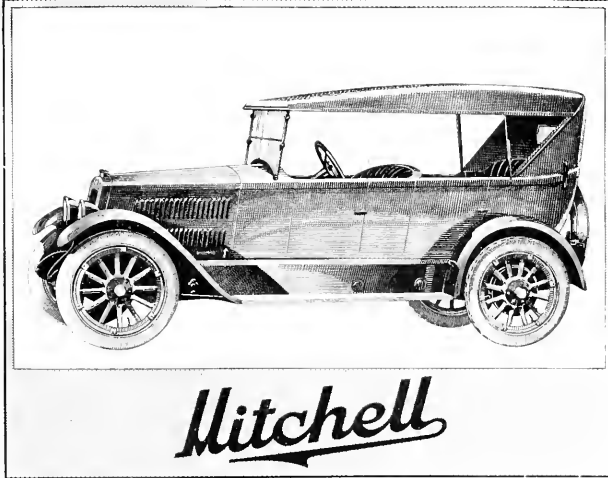
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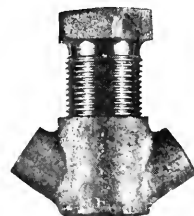


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NUMBER 2

A New and Successful Type of Fruit Evaporator

By W. V. Cruess

IN a recent article, A. W. Christie has given a resumé of the fruit drying situation as it exists in California and has referred to the great interest of fruit growers in this state in evaporations of fruits, in spite of the fact that the reputation of California's dried fruits is based upon the sun dried article. Loss of fruit on sun drying trays from early rains has been the most important factor in causing California fruit growers to doubt the good old sun drying methods; accessory considerations have been the superior quality of the artificially dried product, economy of land for the evaporator as compared to the space required for sun trays and the fact that evaporated fruit is less exposed to contamination by dust, etc., during drying.

Types of Evaporators.—There are numerous styles of evaporators before the would-be-purchaser. He is apt to become bewildered when he meets the enthusiastic salesmen of the various forms of driers and may often succumb to the persuasive arguments of the most fluent agent, who unfortunately usually represents the least satisfactory machine. Thus disappointment often results, and worse than disappointment comes financial loss and waste of at least a season's time. The manufacture of commercially built driers is in a decidedly experimental state—practically none are perfected. This statement is made after a thorough investigation of the many types on the market.

Of the existing commercial machines those designed to dry the fruit upon trays by a horizontal air blast are most successful. However, many of these are far from satisfactory.

The kiln, stack, and Oregon tunnel forms of patented commercial driers are in most cases no better than the tried and true home-made driers of the same types. The Oregon Tunnel as used in Oregon and Washington, is a machine perfected by long use by practical men and is an evaporator of much merit.

How to Select an Evaporator: There are only two ways to select a drier, one, to build a drier fully tested, recommended and described in Government or state publications; the second, to see in operation over a period of at

least forty-eight hours the drier that is under consideration for purchase or erection. During this test be certain that the drier is loaded to capacity. Accept no excuses for poor performance. The machine should be operated economically in regard to fuel and labor; should dry the fruit evenly; should not scorch the fruit; and should dry the product in a reasonable time under a full load. Never has the adage "buy in haste and repent in sorrow" been more aptly illustrated than in the purchase of evaporators.

The writer desires to present in the remainder of this article plans and specifications for a successful evaporator built and operated for experimental purposes by the University of California. The plant holds six tons of grapes or prunes per charge—a convenient size for the average grower, and will dry six to ten green tons of fruit per 24 hours. The complete plant cost in 1919 about \$3,500.

The specifications follow. The general appearance of the plant is shown in the sketches and accompanying photographs.

Furnace Room.—1. Of reinforced concrete 6-inch walls. Floor of gravel.

2. Length 14 feet, width 8 feet, height 11 feet, inside dimensions.

3. One end with opening 8 feet 2 inches high and 6 feet 6 inches wide to connect to drying tunnel and to provide entrance to furnace room.

4. Opposite end fitted with two openings 26x15 inches wide, 15 inches from the ground level and 3 inches from side walls. One door 20 inches high and 15 inches wide in center

wall at 5 feet from ground level. All openings fitted with vertically sliding and adjustable doors. One plain opening midway between side walls 12x12 inches and with center of opening 18 inches from ground level, for insertion of burner.

5. Side walls solid. Roof solid, except for circular smokestack opening 13 inches in diameter in roof 1 foot from end of furnace room opposite tunnel.

6. Furnace to consist of an old boiler shell, approximately 10 feet long and 3 feet in diameter, with tubes removed, with one head removed and opposite head fitted to receive 12-inch pipe. Where wood or coal is used as fuel a somewhat larger furnace and grate should be installed.

7. Air heating pipes to consist of three tiers of 12-inch heavy sheet metal black iron pipe above furnace. Nine pieces 10 feet long, one piece 12 inches long to connect to furnace; one three-way connection to connect to furnace outlet pipe; one three-way connection at stack; four elbows, six return bends; one T in stack with one opening into furnace room with damper, and stacks 20 feet long and fitted with adjustable damper in furnace room. By means of these two dampers gases of combustion may be allowed to flow into furnace room for direct use in drying, thus doubling efficiency of fuel, or the furnace gases may be allowed to escape through the stack.

8. Furnace to be fitted with a medium size air blast stove distillate burner or crude oil burner, air blast type. Latter system would require separate air compressor and motor.

9. Fuel tank. Covered circular sheet metal tank, about 4 feet in diameter and 5 feet high. Connected by 1½-inch pipes to burners at furnace room and dipping vat.

Drying Tunnel.—1. Length inside 33 feet; height from tunnel tracks to ceiling, 7 feet; width 6½ feet inside.

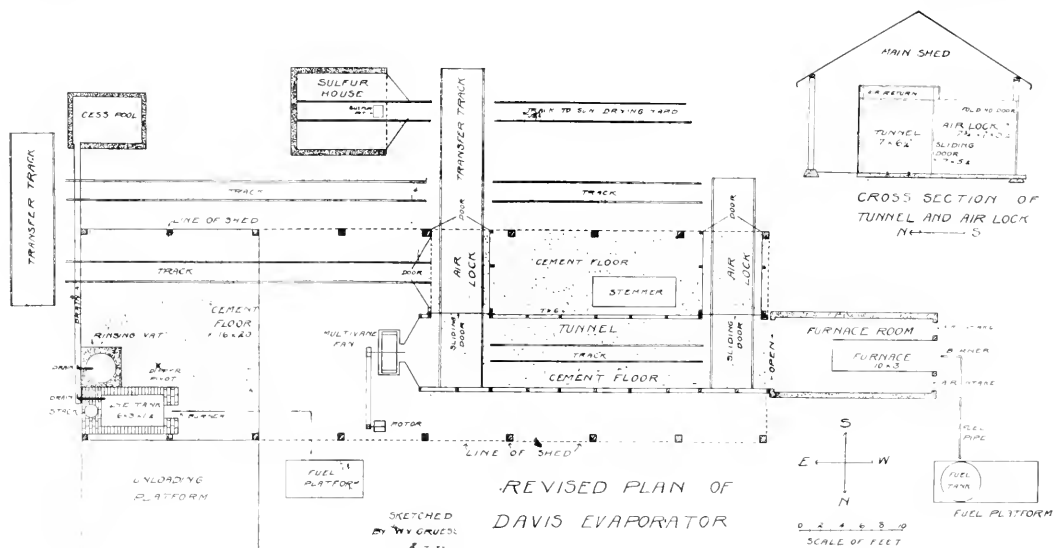
2. Frame of 2x4-inch S-2-E placed 2 feet on centers.

3. Walls, 1x1-inch T. & G. pine flooring on both sides of the 2x4-inch frame. Ceiling, one thickness T. & G. flooring.

4. Floor of tunnel of surfaced concrete. Across 44 inches wide at each end of tunnel opposite doors are made sufficiently lower than general tunnel floor level to permit transfer of



General appearance of evaporator.



University evaporator, revised ground plan.

tunnel cars to transfer ear, and vice versa. Depth about 2 inches.

5. Tunnel floor and ceiling slope $\frac{1}{4}$ inch per foot from fan toward furnace end of tunnel to facilitate moving loaded cars forward.

6. One side sliding door at side of tunnel 10 inches from fan end and a similar door at side of tunnel 6 inches from end of tunnel. Doors to be 7 feet 1 inch high and $6\frac{1}{2}$ feet wide and of double thickness T. & G. flooring.

7. Air return flue $6\frac{1}{2}$ feet wide by 1 foot high and 33 feet long above tunnel. Ceiling of tunnel forms floor of this flue. Walls and ceiling of flue of T. & G. flooring over 2x1 S-2-S Oregon pine. Fan end of flue connected to air outlet of top vertical discharge fan by sheet metal housing fitted with adjustable sliding door. Opposite or furnace end fitted with adjustable folding door.

8. Fan. Outlet end of tunnel connected to a top vertical discharge multivane exhaust fan of such size that its catalog rating is about 18,000 cubic feet of air at 300 r.p.m. and $\frac{1}{2}$ -inch static pressure, corresponds to a No. 6 Sirocco fan or No. 9 Sturtevant multivane exhaust fan.

9. Motor. A $7\frac{1}{2}$ -h.p. motor or engine is needed to operate the fan, which should be fitted with such size pulley as to give about 300 r.p.m. to fan. A 23-inch pulley on fan and 6-inch pulley on a motor operating at 1180 r.p.m. will give about the desired speed.

10. Tracks. Transfer tracks through each tunnel door of 8 pounds per yard dry yard rails set in concrete on 4x4-inch ties. Rails 42 inches apart. One set 20 feet long and other set 31 feet long, latter connecting with sulphur house. Tracks in tunnel extending between the two sets of transfer tracks of 8 pounds per yard rails set 21 inches apart inside in concrete on 4x1-inch ties and are 27 inches from walls inside of rails. Rails extend to edge of transfer car pits at each end of tunnel and are 20 feet 10 inches long. One set of tracks 21 inches apart and 20 feet 10 inches long, 3 feet 6 inches (on center) from outer line of shed, placed parallel to tunnel and connecting with the two transfer tracks which connect through tunnel doors. This track to be continued beyond the sulphur house transfer track 2 feet beyond end of shed housing the dipping outfit, and connecting with a transfer track 17 feet long by which cars may be transferred from track outside shed to track beside dipper under shed. Connecting dipping outfit and air lock at fan end of tunnel is a 21-inch track 35 feet 6 inches long. This track permits loaded cars to be taken to tunnel or sulphur house via air lock and sulphur house transfer track.

11. Air Locks. A compartment $5\frac{1}{2}$ feet wide, $7\frac{3}{4}$ feet long and 7 feet high, connecting to door at fan end of tunnel. Side toward dipper to consist of two folding doors, each $3\frac{3}{4}$ feet wide by 7 feet high, inside measurements. The side toward sulphur house to be formed by two folding doors each 2 feet 10 inches wide.

Walls and ceiling of T. & G. flooring over 2x4-inch pine. A similar compartment at door at furnace end of tunnel, but this to be fitted with two folding doors 2 feet 10 inches by 7 feet at end and no doors at side. Compartments are used to permit entrance and removal of cars without admission of cold air to tunnel.

12. Trucks. Twelve ordinary dry yard trucks as used in Fresno County of wooden frame and built to run on 21-inch tracks. Frames 6 feet long to be removed and placed at right angles to usual position so that in the tunnel the frame will extend across the tunnel. Frame to be extended two inches on either side, making total width of frame 6 feet 4 inches. This permits 1 inch clearance on either side in tunnel. A frame of 2x4-inch material $6\frac{1}{2}$ inches high to be built up in center of car to act as guide for stacking trays. Four level steel transfer cars, Fresno County pattern, for 42-inch tracks.

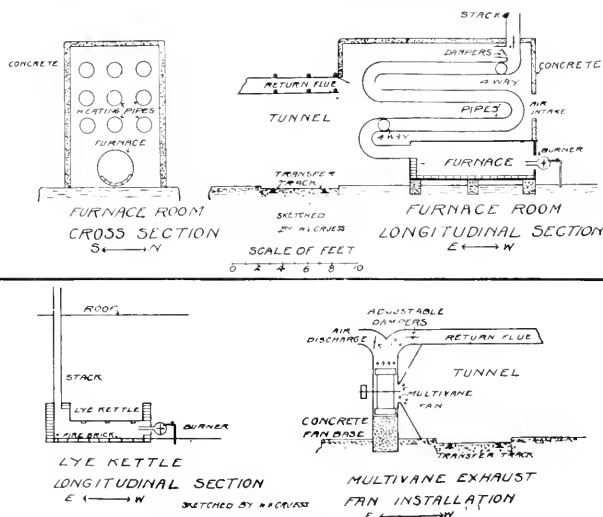
13. Observation Windows. Five 12x12-inch portholes in wall of tunnel, 3 feet from floor and closed with air-tight doors. Portholes to

be so placed that ears of fruit in tunnel may be easily observed during drying.

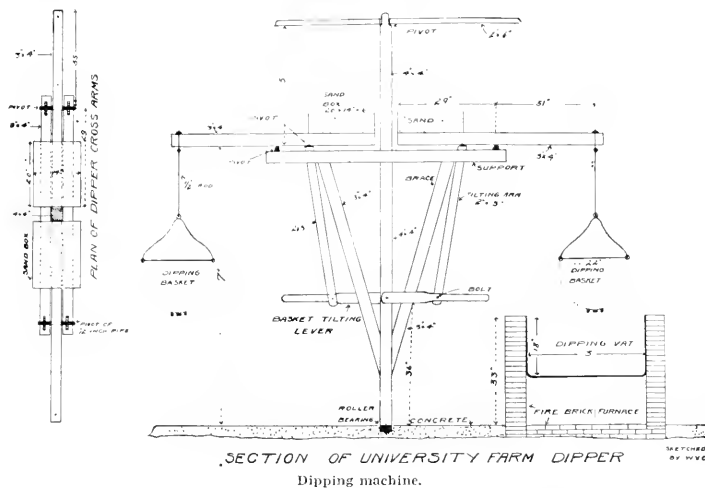
Shed.—1. Shed 64 feet long by 20 feet wide, 8 feet high at eaves. Shingled roof, quarter slope. Roof resting on 6x6-inch stringers on 8x8-inch redwood supports, 8 feet 6 inches long, on concrete piers 8 feet on centers. Sides and ends of shed open. Shed so placed that tunnel wall containing air locks is 8 feet from outside line of shed and other wall 5 feet from line of shed. Shed to house tunnel and dipping outfit, but not furnace room or sulphur house. Ventilator over dipping outfit 10 feet long and 3 feet high, with roof of same slope as shed roof.

2. Shed floor 4-inch concrete, surfaced. Dipping Outfit (for Prunes or Grapes).

1. Dipping Tank. Heavy black sheet iron tank 6 feet long by 3 feet wide and $1\frac{1}{2}$ feet deep, set in firebrick furnace fitted with medium size forced blast oil or distillate burner or larger gravity distillate burner. Top of tank 33 inches from floor. Outer wall



Section of more important parts of evaporator.



SECTION OF UNIVERSITY FARM DIPPER

Dipping machine.

of furnace on line of outer shed and one on end line of shed. Fans to be fitted with 1½-inch drain.

2. Rinsing Vat. Same size and construction as dipping vat, but placed on cement piers. Fitted with 1½-inch drain. Vat placed on path of dipping basket and adjacent to dipping vat.

3. Water supply to fill vats and wash floors. Appearance of this machine best seen from sketch.

Alternative Dipping Arrangement.—One commercially built hand-power prune dipper equipped with rinsing vat and oil or distillate burner in addition to dipping tank. This equipment has proved thoroughly satisfactory, but the distillate burner is essential.

Sulphur House.—Of concrete, brick or wood, and placed beside transfer track connecting to air lock and tunnel at fan end of tunnel. Placed 8 feet from outer line of shed. Size, 8½ feet long by 7½ feet high by 7 feet wide inside. End towards transfer track formed by two folding doors, each 3½ feet wide by 7½ feet high. Small sulphur pit 8 inches square by 6 inches deep in floor between tracks near door. Tracks 21 inches apart, extending to

rear end of sulphur house and transfer track. Adjustable vent 6 inches square in roof. Sulphur house may be omitted; not absolutely essential.

Cesspools and Drains.—If evaporator is not connected to sewer system a cesspool at least 8 feet by 6 feet by 8 feet deep will be needed to care for waste water, or waste waters may be run on land, but may in time impregnate the soil with injurious amounts of alkali.

Steamer.—An ordinary raisin stemmer and 3-h.p. motor. Not absolutely essential, but desirable for dried wine grapes.

Receiving Platform.—At side of shed holding dipping outfit. Length 16 feet, width 12 feet, height 2 feet. Made of 2x12 rough pine and 4x8 frame on concrete piers.

Trays.—Five hundred trays, flat-bottom type, 3x3 feet in size. Sides—Each side made up of one piece 36x2x1½-inch and one piece 33x1x1½-inch. Ends—Each end made up of one piece 36x1x1½-inch. Bottoms—Made up of 4x½-inch strips 36 inches long, placed ½ inch apart, 40 strips to each tray. One brace 1½x3x3 inches extending under middle of tray.

Approximate List of Materials.—1. Lumber

for construction of shed and tunnel: 6x6-inch rough redwood, 18-foot lengths, 162 linear feet; 2x6-inch S-2-E Oregon pine, 550 linear feet; 1x6-inch pine sheathing, 3500 linear feet; 2x4-inch S-2-E Oregon pine, 400 linear feet; 1x4-inch T. & G. flooring, 8000 linear feet; 2x8-inch rough pine, 82 linear feet; 4x6-inch rough pine, 88 linear feet; 1x1-inch rough pine, 64 linear feet; 1x1-inch S-4-S Oregon pine for dipper, 10 linear feet; 3x1-inch S-4-S Oregon pine for dipper, 20 linear feet; 2x12-inch rough pine, 300 linear feet; 19,000 redwood shingles. Total cost in 1919, \$679.99.

2. Shook for trays: 1000 pieces 36x2x1½-inch sugar pine S-2-E; 1000 pieces 33x1x1½-inch sugar pine S-2-S; 1000 pieces 36x1x1½-inch sugar pine S-2-S; 20,000 pieces ½x½-inch sugar pine S-1-S; 500 pieces 33x½x1 inch. Cost in 1919, \$90.

3. Motor or engine, 7½ h.p.

4. Boiler shell with tubes removed, one head removed, and one end fitted to receive 12-inch slack. Size 10 or 12 feet by 36 or 40 inches.

5. Burners. Two medium size air blast oil or distillate burners, or three large ditto, gravity type.

6. Fan. One multivane top vertical discharge exhaust fan with blade wheel 36 inches in diameter through axle (e.g., No. 6 Sirocco or No. 9 Sturtevant).

7. Two tanks for dipper, each 6x3 feet by 1½ inches, heavy gauge black sheet metal.

8. Two 22-inch prune dipping baskets.

9. One set roller bearings for dipper (or items 7, 8 and 9 to be replaced by one hand-power prune dipper and riser).

10. Dry yard rails, 8 lbs. per yard, 400 feet.

11. Black sheet iron heavy gauge 12-inch pipe: Nine lengths 10 feet long; one length 1 foot long; two 3-way connections; four elbows; six return bends; one T fitted with damper; one 20-foot length for stack.

12. About 500 plain bricks and about 500 firebricks for dipping outfit and furnace.

13. About 130 sacks cement for furnace room, floors and sulphur house.

14. About 150 lbs fireclay for furnaces.

15. Three loads crushed rock, four loads sand, 17 loads creek gravel, 1½ barrels lime (used at University Farm 1919).

16. One recording thermometer, range about 50 degrees F. to 220 degrees F.

17. Leather belt 20 feet long, 4 inches wide, 2-ply.

18. Miscellaneous: Nails, water pipe, hose, hinges, roller and trucks for sliding doors, wiring, etc.

A number of these evaporators are being built in California by growers who have been impressed with its performance during the past year. It is suitable for all varieties of fruit.

Cover Crops, Tillage and Commercial Fertilizers

By H. Thorner, Superintendent Horticultural Substation, Corvallis, Oregon

YEARS ago it was discovered that the moisture in the soil could be conserved by keeping the surface tilled and preventing the growth of weeds. Later when orchards were planted in regions where the rainfall was not always sufficient to mature the crop the practice of cultivating the soil to conserve the moisture was commenced. The results were satisfactory for a few years, but various difficulties were encountered later which threatened to destroy many profitable orchards unless the conditions were remedied. The soil commenced to bake, the surface to wash, and finally the trees began to fail. The soil specialists were consulted and they explained that the fault was in the system which was removing the supply of plant food and humus without allowing anything to be returned. To remedy this condition crops of various kinds were sown and plowed under. Soon the conditions of the soil improved and the trees resumed their normal growth and production. Later this system of orchard tillage became

known as the cover-crop method of orchard cultivation, and is today recognized as an ideal if not the ideal method of orchard cultivation.

Correctly speaking, a cover-crop is some farm crop sown about mid-summer and either plowed under in the late fall or allowed to remain until spring when it may be plowed under before or after it has made growth. However, in the broad sense, a cover-crop may be considered as any crop grown in the orchard for the purpose of plowing under as a green manure.

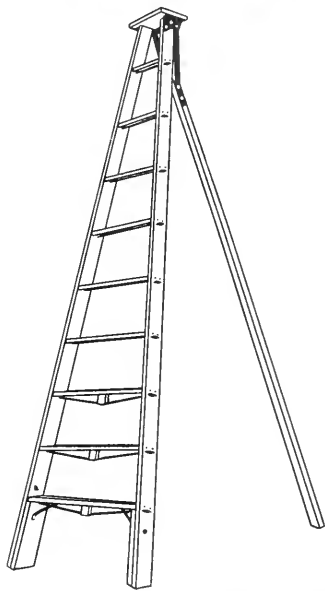
Cover-crops may be divided into several classes. For our purpose we may consider them as leguminous and non-leguminous according to their food storing habits. To the first group belong the clovers, peas, vetches, etc., which gather nitrogen from the air and store it on their roots, while the second group consists of those common grains and even weeds which produce only humus when plowed under. From each of these groups single crops or combinations may be selected which will be

suitable to any district or local conditions.

At this point it might well to review a few of the benefits derived from the use of cover-crops. (1) Cover-crops directly improve the physical condition of the soil and subsoil. (2) Organic matter is like a patent medicine—it is good for whatever ails the soil, but unlike a patent medicine it cannot injure any soil. (3) They help hold the snows and rains and prevent the leaves from being blown out of the orchard. (4) They serve as a protection to the tree roots from frost. (5) They use up the soluble plant food in the fall and hence prevent its loss through drainage. (6) They render plant food available by their growth and root action. (7) They make cultivation and irrigation easier and more effective. (8) Leguminous cover-crops actually add nitrogen to the soil. (9) They cause early ripening of the trees which in turn prevents winter injury. (10) They prevent erosion on steep orchard lands.

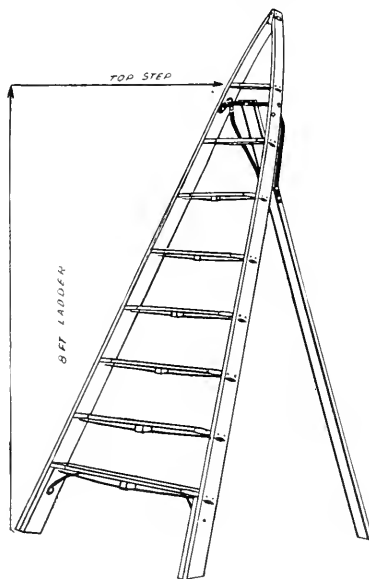
Continued on page 20.

The Northwest's Orchard Supplies



The Northwest Standard

The ladder chosen by orchardists throughout the United States, because it is light and well constructed.



Eagle Brand Ladder

A handy ladder where limbs are close together: easily put into tree without bruising the limbs.



Bastian Straight Pruner

Why waste your time with an old-style pruner, when you can use the Bastian and prune your trees with ease in one-half the time?

Sold for less money than any other pruner on the market, considering quality and workmanship.



Barnett Picking Pails

No bruised fruit when you use the Canvas Bottom Pail with sides lined. The most modern device for picking fruit. Cost is small.

All Northwest Ladders are made of clear spruce and well ironed, with rod under each step. Ask your dealer for the genuine "Northwest." Our name on each ladder. If he cannot supply you, write us direct.

Sectional Pruner

Bastian Sectional Take-down Pruners, three pruners in one, 6-9-12 feet. A few minutes will change from short to long or to medium. One Sectional will do the work for a fair sized orchard.

Put up in 42-inch length cartons. Can be mailed by parcel post.



Northwest Fence and Wire Works

PORTLAND, OREGON

Bookkeeping for the Orchardist

By E. R. Sanford, Head Department of Business Training, Missoula County, Montana, High School

THE experience of the majority of people who have attempted to keep farm and orchard records has not been satisfactory for several reasons, chiefly because at a busy season the records have been neglected. The person waits for a rainy day for writing up the records and the rainy days in Montana have been so few and at such long intervals that a great portion of the facts to be recorded have been forgotten. The effort is made, the results are disgusting and the book is slammed into a corner, there to remain until after the harvest. When the leisure days of winter come, you begin to speculate upon just what your year's labor has netted you, or your income tax return blank arrives to be filled in (if you are so fortunate as to have an income from an orchard which will permit you to make a return), so you dig out the old book and try again, with more or less unsatisfactory conclusions and rather poor guesses as to real conditions of your affairs.

Failure often results from attempting a too complicated system, in which the labor of working out the details is too great for the results secured, and I shall endeavor to give you some few points to help you establish your accounting system.

First, it is necessary to know what results you want to secure, and then shape and arrange your system to fit your case. Don't buy an elaborate sys-

tem and then try to live up to it and shape your career to fit the system. I will try to illustrate this point a little later.

There are some steps which are necessary before you start your accounts, first of which is a complete inventory of your orchard and equipment at a fair valuation. This is your foundation. In fact, it is possible to arrive approximately at your condition by careful annual inventories with comparative analyses. Inventories once set up, it is not a difficult problem to determine what your depreciation may be from use. To illustrate, assume that you have a disc valued at \$50, which under usual conditions, would last ten years, then for inventory value it will depreciate 10 per cent on original value each year for ten years, that is, \$45, value second year \$40, third, etc.

The time to take the inventory is whenever most convenient, but it should be at practically the same date each year. Some people prefer the first of the year, others about March first, just before spring work begins. Your land and permanent improvements, including buildings and trees, should be included as real estate, but the costs of upkeep and operation must be kept separately.

Once you have determined your inventories and listed them in an inventory book or schedule, the next item is the cash account. The best method

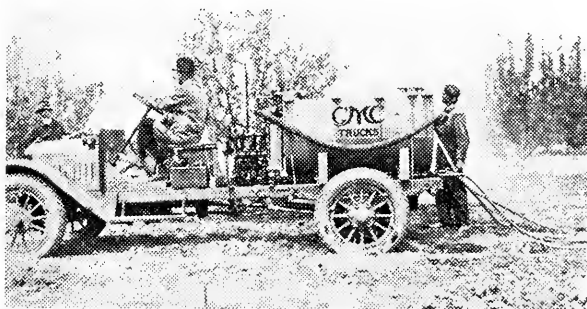
for handling the cash is to deposit with your bank and pay all bills by check, of course, because you then have a voucher for each payment, but it is not always convenient for the orchardist who lives some distance from the bank to handle it in this way. However, you must form the habit of recording all items of cash received or paid out every day, say at the supper hour, or other regular time. The book in which the cash record is kept may be easily classified and arranged so as to reduce the work of making the records and at the same time secure the results desired, with no transfers to other books, this being your permanent and classified record. This is known as the columnar method, which is a cash book with any number of columns, classified by titles at the top of the various columns which makes distribution easy, and the totals of the columns at any time will show total cash costs for the various classifications by months, years, days, or any manner desired.

To make this more concrete I desire to show you some ruled sheets of a cash book showing how results are secured. I want the cost of pruning, spraying,

Cement Coated Wire Nails

If your dealer cannot or will not supply you with Nails, we probably can do so.

A. C. RULOFSON CO.
Monadnock Building, San Francisco



GMC Trucks

Mr. Orchardist:

== Spray the GMC Way ==

Mount your horse-drawn outfit (minus the engine) on our special sub-frame and put it on a GMC $\frac{3}{4}$ to 1-ton truck. The GMC power-take-off and engine operates the pump or not while standing or moving.

The pneumatic tires give the traction. The truck engine gives the power with no attention, while the pump pressure stays at 250 pounds or more.

Loosen four bolts and a chain and you can detach the spray outfit and put on another body. Thirty minutes' work!

The GMC spray shows an actual saving of about 60% over horse operation.

One more reason why the GMC model 16 is AMERICA'S STANDARD ALL-PURPOSE TRUCK.

Seattle
Spokane

ELDRIDGE Buick SALES CO.

GMC ON A TRUCK IS LIKE USA ON A BOND

Yakima
Walla Walla

Receipts	Payments	Prune	Spray	Cultivating Irrigating	Repairs Upkeep	Boxes	Picking Packing	Delivering	Miscel. Taxes Insurance
Apples	1500-	2 men 4 day 3 times 3 day 1000 boxes Picking Packing Hauling	30	42.40	119.12	45.41	159.60	90.00 60.55	
		Totals	30	42.40	119.12	45.41	159.60	150.55	77.55
		Grand Totals							21.63
		Balance							646.26
	1600-								953.74
									1600.00

cultivating and irrigating, implements and upkeep, boxes, picking and packing, delivery. Miscellaneous (such as taxes, insurance and overhead). The wide left hand space is for receipts, the right side is for payments.

Special columns might be added for team feed and upkeep, or tractor, oil and gasoline. The method is sufficiently flexible to allow for any results one may desire. This anticipates a cash business.

Should there be transactions which cannot be turned at once into cash, and with most of us there will be such transactions, then provision must be made for recording the items. The simplest form I can recommend to keep these records will be a sheet or book which we may call the "charge," or customer's, record, where the customer's name will appear for the articles charged to him. This will require another record to group the various charges to each individual under one heading.

A credit, or purchase sheet may be used with the same rulings as the cash sheet where the name of the party is entered and the items of cost distributed to their respective columns. The totals of these columns on the purchase sheet must be combined with those of the cash sheet to show total cost of operating.

Assuming you have now kept complete records for a year, we are concerned with determining our present financial condition.

	1917	1918	1919	1920	1921	1922	1923
\$2000							
\$1500							
\$1000							
\$ 500							
0							

Two problems present themselves: First, what are our assets, our liabilities, and what is our present worth? Second, what has been our income, our cost of operation, and our net increase or decrease in operation?

Problem one, our present worth, will be our present inventories, the personal accounts and notes due us, and our balance of cash, minus the debts and notes we owe.

Problem two, income will be the total receipts, and our cash-operating costs will be the sum of the various footings

of the columns on the cash sheet. Our net increase or decrease in operation will be found by adding our cash income and sales on account, and deducting the cash operating costs, the operating purchases on account together with any depreciation in equipment shown on the inventory sheet.

To illustrate, assume that at the first of the year you started with real estate valued at \$2,500 and equipment of \$500. Your worth at beginning is \$3,000. At the end of the year your inventory shows real estate valued at \$2,500, implements \$500 less \$50 depreciation. Your cash sales were \$1,600 and your sales on account were \$400. Your purchases on account were \$100 for repairs, upkeep, etc. Then we are worth today in real estate \$2,500, equipment \$450, personal accounts \$400, cash \$953.74—total assets \$4,303.74, minus the liabilities, \$100, or \$4,203.74. Our income was \$1,600, our cash operating costs \$646.26. Our net increase is the total sales (\$1,600 our cash plus \$400) \$2,000, minus the cost of operation (\$646.26 cash plus \$100 on account) \$746.26 and depreciation (\$50, or \$796.26), leaving \$1,203.74. This increase, when added to our original worth, \$3,000, equals our present worth as found above, \$4,203.74.

This I would suggest, that you keep some sort of graph, or picture, of your operations which can be adjusted each year but which shows at a glance what progress is being made. See the following:

I want to reiterate that the most important thing is for you to make the record; that is where most of us fail. I know one man who is keeping a record of his work, who does it on a calendar. Well, that is all right; I don't care what you use for your book account; he writes it there, and at the end of the month he turns to this sheet and groups these items together, transferring to permanent sheets. If you want to keep books that way, it gives fairly good results—you have your record, anyway,

at the end of the year, and that is important.

The time to do this posting, I suppose, for most of us, is along about the supper hour, when the day's work is over; record what you have for the day's business. Most of these men who are working for the horticultural office here, who have to go out and do field work, must make a record and report, so why can't we all do it? The end of the day's work is the usual time. Let us try to mark the day's report somewhere—on the calendar, or wherever most convenient—and then, when you get the totals at the end of the month or year, it is very simple to figure up and determine where you stand.

UNQUESTIONABLY—

Modern methods applied to fruit growing have made the Northwest a great fruit growing center, with possibilities of extensive development.

Modern methods applied to banking have made the FIRST NATIONAL BANK pre-eminently the ally of the horticulturist. Its facilities, service and the personal interest of its officers are at your disposal.

THE FIRST NATIONAL BANK
OF PORTLAND, OREGON
THE FIRST NATIONAL BANK
OF THE ROCKY MOUNTAINS

MYERS
HONOR-BILT
PUMPS
FOR EVERY PURPOSE

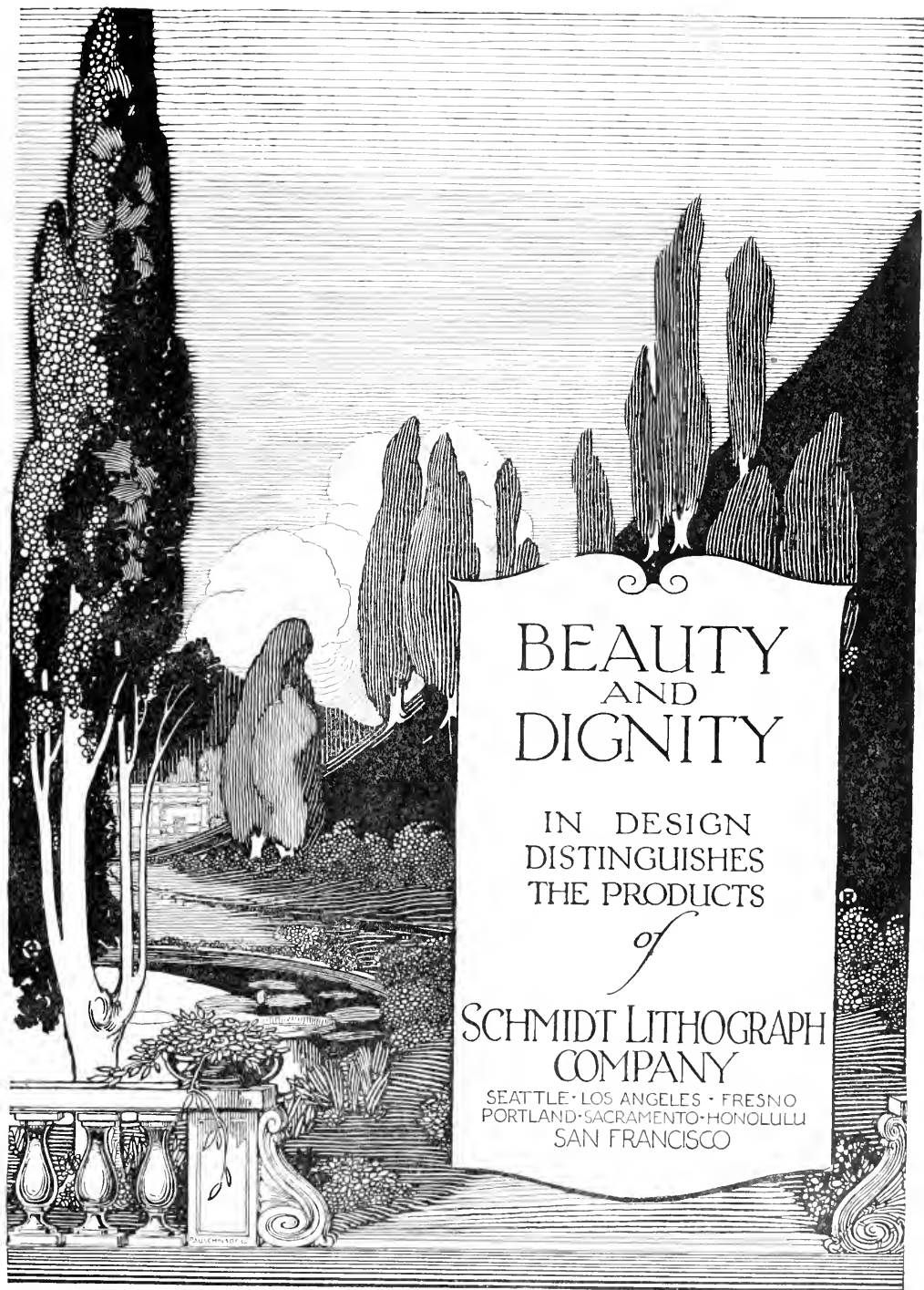
There's one for every home or farm need. Myers Self-Oiling Electric House Pump shown here, and other Myers Hand and Power Pumps for home water systems, give running water in kitchen, bath room, laundry, and in barn or troughs. Myers dealers are everywhere. They handle Myers Hay Tools, Door Hangers and Hand and Power Spray Outfits too. Ask yours today or write for catalog, it's FREE.

F. E. MYERS & BRO.
135 Fourth St. Ashland, O.

PACIFIC NORTHWEST DISTRIBUTORS

PORTLAND, ORE. **Mitchell** SEATTLE, WASH.
LEWIS & CLARK

BUY FROM THE LOCAL MITCHELL DEALER



BEAUTY
AND
DIGNITY

IN DESIGN
DISTINGUISHES
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SEATTLE • LOS ANGELES • FRESNO
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**BEST SERVICE-
QUALITY & PRICES**

**PERFECTION IN
FRUIT
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THE **SIMPSON & DOELLER CO.**
1423-24 NORTHWESTERN BANK BLDG.
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E. SHELLEY MORGAN
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WE CARRY-AND CAN SHIP IN 24
HOURS-STOCK LABELS FOR PEARS,
APPLES, CHERRIES & STRAWBERRIES.

BETTER FRUIT

Spraying Tests Developed Important Results

By E. J. Newcomer, Scientific Assistant U. S. Bureau
of Entomology

During the season of 1919 the United States Bureau of Entomology, in co-operation with the Washington Experiment Station, carried on an extensive experiment for the control of the codling moth in a 13-year old orchard near Yakima. Tests were made of several arsenical poisons, and of various methods of applying them. These included the use of guns in place of rods, the use of a spreader, and extra calyx and cover applications.

"We have carefully compared all these variations with a standard method of spraying, which consisted of one calyx and four cover sprays, five sprays in all, using the rods and powdered arsenate of lead, one pound to fifty gallons.

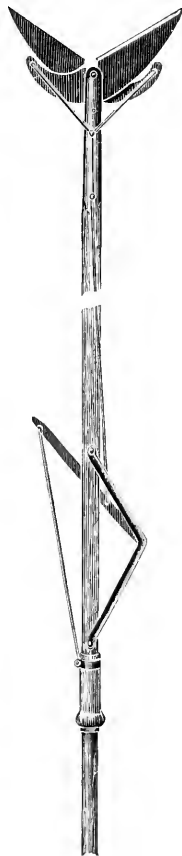
We have figured the results, not only in percentages of wormy and clean fruit obtained, but also in dollars and cents. First, we have figured the actual value of the fruit, then the actual cost of spraying, and from these figures we have obtained the net value of the fruit sprayed by each method. Other orchard costs and damage to fruit from causes other than the codling moth, are not considered, since they would be the same, no matter what method of spraying was used. These figures are much more satisfactory than the figures showing the number of the wormy apples, since these latter do not take the cost into consideration.

Probably most growers, if they have not already decided it for themselves, want to know whether the gun is more efficient than the rod. Many people already realize that it is quicker and takes less spray, but does it do the work? In other words does it pay? Our single year's work shows that it costs about one-fourth less to spray with a gun than with a rod, and that if properly used, the fruit will be just as clean as though sprayed with a rod, if not cleaner. It therefore does pay but the amount saved is not very great, and may be lost with careless work.

Another question frequently asked is whether it does not pay to use more lead per tank. We used three pounds of powdered lead to every fifty gallons in one plot, and got enough more clean fruit, as far as worms are concerned, to pay for the extra lead. But we had too much poison on the fruit at picking time, and with many varieties the amount of color may be reduced.

We cannot recommend using lead stronger than one pound to fifty gallons. If you have some extra lead you want to use put on six sprays instead of five. It only costs about 10 cents to spray a tree once, and if timed right you can save a dollar's worth of fruit. In the orchard we sprayed, we actually did save the owner more than a dollar's worth of fruit on every tree we sprayed six times instead of five. This was with an average yield of fifteen boxes per tree.

Top Dressing Pole Shear



Use the Bastian Pole Shear and cut the shoots from each tree in a few minutes.

5, 6, 8, 10 and 12 foot lengths.

Northwest Fence and Wire Works

SOLE MANUFACTURERS

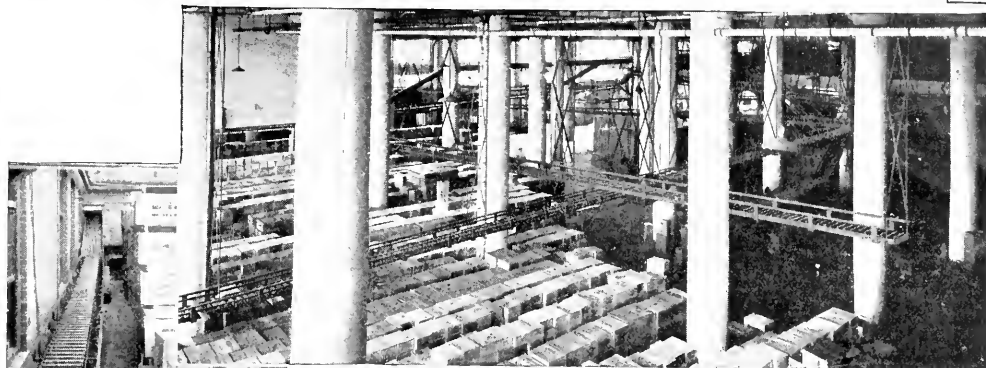
PORTLAND, OREGON

Established 1882

F. W. Baltes & Company Printers

WE print anything from the smallest to the largest and always welcome orders of any size or quantity, giving prompt, personal and efficient service. Mail or phone inquiries are solicited. We do not specialize—experience and equipment enable us to print everything equally well. We render service in preparing copy and illustrations and furnish plans and estimates for catalogs, booklets, publications, billboard and any other kind of advertising.

First and Oak Streets
Main 165; Auto 511-65
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With a Mathews Conveyor system the California Associated Raisin Company can fill or empty this warehouse in one-fourth the time and with one-fourth the labor it would require to do it by wheeling, trucking or carrying. And note the floor space saved! Mathews Conveyers are just as practical in your line of business—indoors or out.

One Big Labor Problem Solved

YOU can't cut down productive labor without cutting down production. But you can cut down handling labor and thereby actually *increase* production. Here's how:

Convey by Gravity—to and from cars, from floor, operation to operation, warehouse to shipping platform, etc. Gravity conveying speeds up production by keeping the lines of supply and output open; hands busy; machines "fed".

Gravity costs nothing—draws no pay; consumes no fuel. Gravity reports every morning; no hands short. Gravity stays on the job; lives forever and never goes on strike. Gravity works most anywhere and carries most anything—boxes or bales, barrels or buckets, bundles or bags, cases or crates, cartons or cans, lumber or bricks, castings or pig, etc.

Gravity conveying saves in a way that can be plainly seen—in smaller

payrolls, lower costs, greater production. Look into it. A letter or postcard brings further information and, if desired, a nearby Mathews branch sales engineer qualified and glad to discuss your particular problems. No obligation.

Mathews systems are the most thorough exponents of gravity conveying on the market. They are engineered systems. Each is specially adapted to the requirements of the business, plant, layout, handling routes of the concern it is to serve. Portable single units for light work, short hauls, etc.

Patented drawn-steel, ball-bearing rollers balanced true and shaped to hold objects to their course. Special rollers for brick and tile, bundled shingles, etc.

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SPEED ECONOMY
GRAVITY ROLLER CONVEYER



BETTER FRUIT

An Illustrated Magazine Devoted to the Interests
of Modern Fruit Growing and Marketing.
Published Monthly
by

Better Fruit Publishing Company
703 Oregonian Building
PORTLAND, OREGON

Improved Drying Processes.

In publishing the details of the new fruit evaporator recently perfected at the Experiment Station of the University of California at Davis BETTER FRUIT is doing so in the hope that it will prove of benefit to many growers who are somewhat at sea in regard to processing prune and other fruit crops. The great increase in the prune crop in the Pacific Northwest is making it necessary to provide greater and better drying facilities and withal, for growers to secure a dryer at a nominal cost that will handle their crops expeditiously.

While growers and others who are familiar with driers of various types may not agree with all the statements that Mr. Cruess makes in regard to the apparatus which the University is so highly recommending it should be borne in mind that it has been subjected to tests for some time and its nature so fully explained that the grower is not left in the dark. It is also being put before the public to accept or leave alone without cost. Another point is that although growers who are in need of a drier may not wish to use all its features there may be some of them that they might embody in their present plants at a distinct advantage.

Saving the Crop.

While improvement in labor saving packing house and orchard equipment has probably been slower in coming than in many other lines there are many devices now on the market that mean large savings in handling fruit crops. Yet we are told that it is more or less difficult to get growers to depart from the old way of doing things and try the new and more economical. In many instances where crops could have been handled with greater rapidity by these new devices and saved, large losses have been sustained through lack of storage, bad weather at harvesting time or some other cause. The orchardist who is able to move his crop to market early in the season is playing the safest and most successful game in the fruit business as a rule. Anything that helps in this process therefore should not be neglected and any needed apparatus or equipment will pay for itself many times over.

The Penalty of Neglect.

Neglecting to eradicate or control fruit pests is always disastrous. The fact that the grower may have some insignificant looking insect in his orchard that does not appear to be doing any particular damage at the time being is no excuse for his not investigating. A slight infestation this year may mean a very extensive one next year with

attendant heavy losses. In their investigations of diseased or pest infested fruit trees specialists have found almost invariably that had these cases been reported to authorities on the subject at the time of their inception the disease or pest could have been stamped out, many thousands of dollars saved and years of toil avoided. If you have a condition in your orchard fruit that you know is not normal and don't know what it is, consult some one who does. Or if you do know what it is don't neglect it.

The Transportation Problem.

Continued reports of an expected shortage in cars to handle the fruit crop during the heavy shipping season this year make it imperative that no step be neglected to avoid such a contingency if possible. For shipments to nearby points considerable help in this direction can undoubtedly be secured by establishing motor truck lines as is being done in the East. At least this is a point that may well be considered by shippers in their efforts to reduce to the minimum the number of cars needed. By investigating the possibilities of utilizing to some extent this mode of shipment in each of the fruit shipping territories it is more than probable that fruit transportation can be greatly aided.

As the large bulk of Northwestern tree fruits, however, are destined for far away points we again wish to call attention to the advisability of organizing committees, or other bodies, or securing individuals to take charge of the matter of the car situation at an early date. If nothing else is accomplished the information that will be secured will be of vast benefit to both shippers and growers in regard to crop movements and in providing storage.

Fruit Picking Prices.

In California fruit picking prices are not a matter of individual bargaining. Organization largely rules in this as in other phases of the fruit industry. It is therefore interesting to read the following item taken from the California Fruit News:

"A meeting of growers in Santa Clara Valley, who are members of the Farm Owners and Operators Association there, met recently in San Jose, and after a discussion of the question of wages for fruit pickers and orchard help this year, passed a resolution establishing the wage scale at 50c an hour. The resolution provides that there is to be no overtime paid and that the wage is 50c straight for whatever number of hours the worker may be employed or work. This makes it unnecessary to determine a day's work, as conditions vary from day to day and orchard to orchard in this regard. The orchardists expressed the opinion that the help available was as sufficient and efficient at that price as under any other conditions. The same organization has chapters in other counties and uniformity of action in this regard is expected to prevail."

Mechanics and Agriculture.

It would seem that some of the hard grind that has made the life of the fruitman during the period of cultivation and spraying not of the pleasantest, may be eliminated to some extent. The coming of the tractor has greatly helped in the matter of cultivation and now the combining of the tractor with the sprayer bids fair to still more lessen the work of one of the most disagreeable tasks in an orchard. Gradually the inventor and the expert mechanic are bringing to all phases of agriculture the benefits of labor-lessening motive power. It is not too much therefore to expect in the future that with the extension of most of the city conveniences to the farm and orchard the tide of human endeavor will be toward the soil instead of away from it. With the joining hands of mechanics and agriculture no one can foretell how the model farm or orchard may be conducted in the years to come and not so many years at that.

What They Say About Better Fruit

I am sending you today money order for one year's subscription to *Better Fruit*. If collection by post should not be possible will you please remind me when I should renew my subscription and I will send the money at once, for I cannot afford to miss this fine magazine. —W. Schnyder, Utewyl, Switzerland.

Received the numbers of *BETTER FRUIT* and wish to state that the article on spray vs. dust for codling moth control was worth more to me than the price of the paper for a decade. I was on the fence in regard to the methods to be employed until I read this article through thoroughly. I can now begin our codling moth spraying in a few days with a duster and power sprayer both at my command and do the work intelligently. I enclose my check for the year.—W. G. Yeager, Taylorsville, North Carolina.

Mr. Baker, one of our directors, reported to a recent meeting of our directors the kindness, consideration and assistance which you so kindly afforded him during the time he was in London and New York. We beg to assure you that your courtesy was not only appreciated by Mr. Baker, but also by our directors, and we beg to convey to you their best thanks.—The Wargundy Orchards, Limited, Bloemfontein, South Africa.

Former address Fremont, Michigan. This position which I now hold here was procured by advertising in *BETTER FRUIT*, and I want to thank you for the opportunity. I have given me.—Alton M. Porter, Marble, Washington. Former address Fremont, Michigan.

Under separate cover I am sending you some information about our apple show. I visited Oregon several years ago and retain very pleasant recollections of it. I take your paper and find it very interesting and full of useful information.—L. M. Shootridge, Hobart, Australia.

Will you kindly forward me some information in regard to combatting the apple leaf hopper and the woolly aphid. If my subscription is in arrears please let me know and I will send check. I also wish to say that your paper has been of much help to me in solving the problems of the fruit business and I wish to express my deep appreciation of your valued publication.—W. Clark McGinnis, Orondo, Washington.

Nobody begrudges the retailer a reasonable profit on perishable goods but when he can buy a crate of onions for less than \$2 and sell them at \$7.50 it looks like he's serving himself better than he is the public.—*The Packer*.

THE SUCCESS LINE IN ORCHARDS

MEANS
Maximum Efficiency and Economy

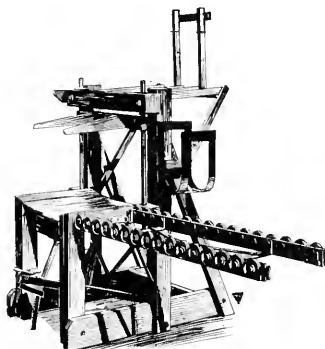
THIS BOX LIDDING MACHINE

Built on new principles, is adaptable to any style packing house, for it has open back and ends permitting the free passage of boxes in any direction. Roll feeders and carriers attach at either end or back.

Extra heavy construction, assuring full rigidity and perfect alignment.

Adjustable to any size boxes.

Pressmen in large packing plants say: "It's the swiftest, surest and easiest operating of any press on the market and will outlast five other machines."



The Success Ewing Orchard Ladder

Built on scientific test and calculations and of AIRPLANE SPRUCE.

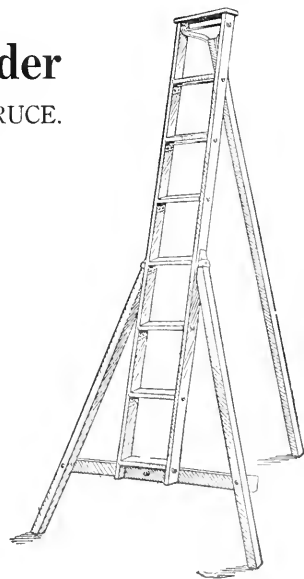
It is the lightest ladder on the market. Built for strength.

8-foot ladder weighs 27 pounds
10-foot ladder weighs 31 pounds
12-foot ladder weighs 40 pounds
14-foot ladder weighs 44 pounds
26-foot ladder weighs 53 pounds

No Wobble --- Always Steady

DEALERS

Write for terms and our liberal contract. Same choice territory still open for reliable dealers.



MANUFACTURED BY

Success Seed Grader Co.

SPOKANE, WASHINGTON

MANUFACTURERS OF

Orchard Supplies, Fanning Mills, Seed Graders, Pea and Bean Threshers, Foundry Work, Buckets, Chairs, Wire and Zinc Screen

Northwest Cherry As An Income Producer

By C. A. Bell

CHERRIES! Don't your mouth water at the very mention of the word?

To one who lives in the east or the middle west a cherry means a small red fruit sour enough to make a pig squeal but capable of making delicious pies or preserves, granted there is no limit to the sugar supply.

Several varieties of sour, or so-called pie cherries are successfully grown in the middle states, notably the Early Richmond, Late Richmonds, English Morello, Wragg, and Montmorency.

But when you say "Cherry" to a resident of Washington, Oregon or Idaho, it runs the gamut of all the delicious, soul-satisfying list of sweet, sweeter, sweetest black, blacker, blackest, pink, pinker, pinkest, redest, purplest and liver-colored varieties known to modern horticulture, and among which at least one can be found to suit everybody, and most people like the whole list.

And what fruit so universally appeals to a human being (or a bird) as the cherry?

If you doubt it, just come to Cherry Lane, a mile or two from Grandview, Washington, some Sunday afternoon in June and sit under a tree unobserved, and see how many of the three or four hundred automobiles can get by without having "car trouble" that necessitates a stop.

Other fruits there are that are good but the cherry is the first tree fruit of the season and you need the wholesome, sprightly, acid and sugar combination to get the bile out of your liver and the grouch out of your system.

But what about cherries as a commercial crop?

Are they profitable?

Can they be depended upon to produce every year?

How many tons per acre would be a paying crop?

Has the market ever been overstocked?

What varieties pay best?

Where is the market?

How old must an orchard be before it will pay expenses?

Hold on now—one at a time—it would take a big book to hold all that the writer does not know about cherries, but he can relate some of his experiences as a grower of cherries on a small scale for 16 years, in the state of Washington.

Some things he has learned that have been too well demonstrated to be any longer in doubt as to profit, we know of no fruit grown in the Yakima Valley that will show more net profit per acre than sweet cherries.

Why? Because people will eat them even if they cost 40 or 50 cents per pound.

Because the territory upon which sweet cherries can be successfully grown is so limited in comparison to the territory upon which most other fruits can compete with us.

Because the trees grow very rapidly, come into bearing very young, cost much less for spraying and pruning than other fruits, and the fruit itself is so perfect that there are no culls worth mentioning.

Everything depends, however, upon a very few essential points.

Location is the most important.

One must have good elevation.

Good soil drainage.

Good air drainage.

Good nursery stock.

Good varieties.

Convenience to shipping point.

The market proposition is in a large measure solved by the canneries recently erected at nearby points and by the square dealing fruit buyers who have warehouses by the dozen throughout the whole Yakima Valley. They have paid from 7 to 12½ cents per pound without packing or package for the past two seasons.

If one has facilities for packing at home, and knows how to put them up

Cement Coated Wire Nails

If your dealer cannot or will not supply you with Nails, we probably can do so.

A. C. RULOFSON CO.
Monadnock Building, San Francisco

THE CUTLER STEEL PRESS

We believe this press to be the superior of any press on the market and the following are its main points of superiority:

1. As shown in the cut, this press can be connected with gravity carrier, bringing the unlidded fruit to the press from either side and taking away the boxes after being lidded. The pressman does not have to lift the boxes to get them into position, as they slide easily on the smooth metal top of the press.

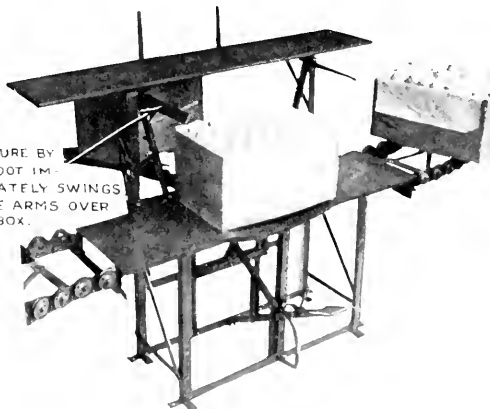
2. When the box is nailed it may be tipped over backward onto the gravity carrier connected to the back of the press. This is an exclusive feature of the Cutler Steel Press and will materially increase the output of any pressman.

3. There are no arms or parts above the box to interfere with folding the lining paper or placing the lids, another very desirable point. After the pressman has placed the lids a light pressure on the foot lever brings the presser arms first into position over the box—then downward.

4. The presser arms are connected with an equalizer bar which evens the pressure on the pack at the two ends of the box. Pressure on the lids crosswise of the box is equalized also.

5. With the exception of the shelf The Cutler Steel Press is built of steel and will stand years of hard usage. Never out of order. Will not rack to pieces.

PRESSURE BY
THE FOOT IMMEDIATELY SWINGS
THESE ARMS OVER
THE BOX.



The No. 1 Steel Cutler Box Press, \$70.00 f.o.b. Portland
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and where to ship, much more can be realized.

As to varieties, the writer considers the Bing far and away in the lead, all things considered. It combines good quality, large size, tough skin, which makes it the very best shipper, and immense yielding capacity, and ebony color. It will not, however, produce well planted in solid blocks unless some other pollinizer is provided at right intervals.

Black Republicans, Tartarian, Governor Wood, all serve the purpose, but for maximum results we recommend budding or grafting into each Bing tree

a small twig of the Mazzard seedling.

Next to the Bing, we have found the Lambert most profitable. It has two serious faults: one is a tender skin which cracks in case of showers, and a propensity to shell from the stem and drop when over-ripe or in windy weather.

Third on the list we would place the Royal Anne, or as it is sometimes called Napoleon Biggareau.

This is indeed a noble cherry with strikingly beautiful tints of white, pink and dark red, its snappy, tart, rich juices and its remarkable bearing qualities. It is the favorite for commercial

canning and for maraschino preserves.

The Late Duke, while not as profitable as the sweet varieties mentioned, is the surest cropper of all, withstands severe frosts at blooming time and blooms last. While classified as a pie cherry it is far from sour when well ripe and nearly as large as the Royal Anne. It can be successfully grown where the sweet varieties would freeze out nearly every year.

How many tons per acre can be produced?

We should hardly dare to name the amount we believe possible but we have grown eight tons on much less than an



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IF YOUR POULTRY just boards with you instead of producing—perhaps it's the feed that's at fault. For good results you must put something into your hens besides "filler".

OLYMPIC Egg Mash will put the "star boarders" back on the job for you.

OLYMPIC Egg Mash contains Linseed Oil Meal, Soybean Meal, Corn Feed Meal, Flour Middlings, Wheat Bran, Ground Oats, Ground Barley, Alfalfa Meal and DRIED BUTTERMILK.

These scientifically selected and balanced ingredients in **OLYMPIC** Egg Mash will bring a poorly fed flock back to laying in about two weeks. You'll get plenty of eggs, each full of vitality.

DRIED BUTTERMILK not only furnishes its share of protein, but the lactic acid supplied compels the digestion and assimilation of the other elements. Considered one of the best feather-growing foods, its presence in **OLYMPIC** Egg Mash shortens the moulting period by rapidly "dressing" your fowls with even feather growths.

OLYMPIC Egg Mash is but one of the complete line of feeds for Poultry and Livestock. If your dealer can't supply you write to—

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acre and \$60 worth on a single tree eleven years old. We have never missed a paying crop in the six or seven years the trees have been in bearing and would not consider \$1,000 per acre anywhere near the value of a first class cherry orchard old enough to bear.

We make no claims that we do not believe this can be duplicated or sur-

passed by some of our neighbors as to yield, profits, or faith in cherry orchards.

We should take pride in showing anybody some of the top notch young cherry orchards within two or three miles of Grandview, Washington.

Yes, we are a crank, and frankly admit it.

Logged-Off Land for Nut Growing

By N. E. Britt

MY conclusions as to the possibility of nut-growing on logged-off land are based chiefly on my own experience. In 1910 I planted between four and five acres of seedling Franquette walnuts on land which had been quite heavily timbered with fir. The large trees had been cut several years before the stumps of which I removed, and planted seedling Franquette walnuts, 52 feet apart. In 1917 I put out 600 filbert trees in part of my walnut orchard, planting the filberts between the walnut trees, 13 feet apart. The walnut trees are just beginning to bear and I am delighted with the prospects. I have noticed some catkins on the filbert trees recently, which give promise of some nuts next season. The trees have made splendid growth and are very vigorous and promising.

These lands are on Parrett Mountain, about 700 feet above sea level. The soil is what is generally designated as shot land, with about as near perfect drainage, both air and water, as could be

desired. I consider the elevation gives them much protection from both spring and fall frosts. Much similar land, in soil, drainage and climate is in western Oregon and Washington, varying in altitude from 400 to 2500 feet above sea level; the timber of which has been removed by loggers and forest fires. These lands are encumbered with stumps, snags, logs, and brush, fir, hazel and laurel.

Burned over lands are more easily put in cultivation than the logged-off lands. Much of the land is embraced in the land-grant of the O. & C. Railway Company, which the road claimed for a number of years. Recent decisions of courts place title to these lands with the United States, and a part of them are now offered to homesteaders at \$2.50 per acre and residence of three years. There are some other requirements, as to cultivation and improvements, with which I am not familiar.

I am aware of two nuts indigenous to these lands, the hazel and chinqua-

pin, which, I suppose, indicate that the chestnut and the filbert could be grown. The English or Persian walnut, filbert, black walnut, butternut, chestnut and hickory-nut are now grown on similar land. But as the English walnut and filbert are so superior to the others mentioned, walnuts and filberts only will be considered.

I am aware these lands, encumbered as they are with stumps, snags, logs, fir, hazel, dogwood and laurel brush, do not present a very inviting prospect for nut culture; but explosives and fire get away with these encumbrances, leaving a soil supplied with all of the elements of tree-growth.

I would pursue different methods in starting a filbert or a walnut orchard. Filberts should have the land thoroughly cleared and prepared. For walnuts I would saw down the snags and burn them and the old logs; would grub out the hazel, dogwood and laurel; cut small fir and brush and burn them, leaving the large stumps, and plant walnut trees wherever there was room, regardless of rows; would enclose my planting with a fence, and protect my trees with wire netting, and pasture with sheep; would spade around the walnut trees in the spring, for four or five years, after which I think the trees would thrive and take care of themselves.

In conclusion I will say, considering soil, climate, and drainage, the possibility of these lands for nut-growing is very inviting and big with promise.

Apples Suitable for Evaporation

There is an increasing demand for dried apples of the highest quality. The tendency has sometimes been to make quantity at the expense of quality. But prices are governed not only by the supply but also by the grade. The cleanest, whitest fruit, that is well cored, trimmed, bleached, ringed, and dried, is most in demand. Carelessness in any particular injures the product.

Primarily the economic usefulness of an apple evaporator is through its utilization of windfalls and the poorer grades of fruit which cannot be marketed to advantage in a fresh state, and it is these grades that are most often evaporated. But the magnitude of the crop also influences the grade of the evaporated product in a decided way. In seasons of abundant crops and low prices for fresh fruit large quantities

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THE REGISTRAR, Oregon Agricultural College, Corvallis, Oregon

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Dog Medicines

BOOK ON DOG DISEASES And How to Feed

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118 West 31st Street, New York

of apples that would ordinarily be barreled are evaporated and the grade of stock produced is correspondingly improved. On the other hand, in years of scanty crops, when all apples that can possibly be shipped are in demand at high prices, only the very poorest fruit is evaporated, as a rule, thus lowering the grade of the output.

The commercial grading of evaporated apples is based primarily on appearance rather than on dessert quality, and the fact that one variety may make a better flavored product than another is not considered. As a rule, a product of high commercial grade can be made from any sort which has a firm texture and bleaches to a satisfactory degree of whiteness. A variety of high dessert quality, such as the Northern Spy, may be expected to make an evaporated product of correspondingly high flavor.

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Not what you buy at the average paint store. 35 years' experience with preservative roof paint has taught me to give you a superior paint at less cost. Black, red, brown, green and yellow colors. Used for wood, tin, iron, slate, etc. **NO TAR.** It forms a thick rubber like water-proof coating over the surface to which it is applied and will withstand the hot sun, rain and snow. Applied with a brush.

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In sections where the Baldwin apple is grown extensively, it is in demand at the commercial evaporators, as it meets the requirements in a fair degree and it is also available in relatively large quantities. In the Ben Davis sections that variety supplies a similar demand.

Most early varieties lack sufficient firmness of texture for the best results and are undesirable on this account. On the other hand, some comparatively early sorts, such as Gravenstein and Yellow Summer Pearmain, are considerably prized in some sections. The dessert quality of the latter is especially high.

Similarly the product made from other sorts possesses qualities that are due more or less to varietal characteristics. For instance, that from Esopus is said to be unusually white; Hubbardston and varieties of the Russet group also make very white stock. The latter make relatively a large amount of stock, by weight, to a given quantity of fresh fruit. Limbertwig is said to produce from one and one-half to two pounds a bushel more of dried stock than most sort do, but it is not as white as that from some other varieties.—The Evaporator.

Leaf Roller Serious Pest

The seriousness of the leaf roller as a pest was recently shown to a large number of growers in the Spokane valley when an orchard demonstration was held by the district horticultural inspector in that district to show the results of its work. It was found that in many instances the work of this insect had been so destructive that there will be but little fruit and in some cases none at all. In telling of the difficulty in getting the growers interested in combatting this pest the horticultural inspector writes **BETTER FRUIT** as follows:

"During last season the writer encountered in the Spokane Valley the larva of the fruit tree leaf roller working in some of the orchards and tried

to impress upon our growers the serious nature of this pest—it is quite apparent that we did not get very far in this matter for most of them felt that it was a "joke"—but I can assure you that they have now decided after seeing the ravages of this little "chap" thus far this season, that they really have something that is going to put them out of business if they do not concentrate every effort to exterminate it. We have only recently been able to hold an orchard demonstration at which were present 175 fruit growers, and we finally took steps to secure something definite in the nature of a supply of miscible oils for another season's spraying campaign, which by the way so far has

3 Good Buys

Valuable Oregon Fruit and General Farming Acreage

No. 1. 311 acres near Yamhill county seat. 235 acres apple and walnut trees; balance pasture and grain land. Electric lighted 6 and 8-room houses; new barn and other buildings. Power line connection. Fine springs.

No. 2. 1122 acres, ¼ mile from No. 1. 350 acres rich bottom land; 100 acres plateau, seeded to oats and wheat. 7-room house. County road to run through tract. Creek and springs. Electricity available. Complete set farm implements, including two tractors, goes with Nos. 1 and 2.

No. 3. Ideal gentleman's home at Hood River. 73 acres. Standard varieties apples, and some pears. Irrigated. Fine modern residence and small new house. Good roads.

* 1920 apple crop for sale.

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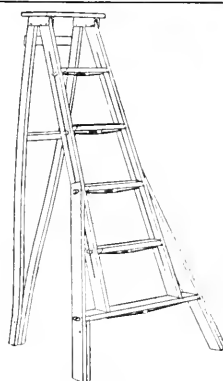
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Highest Quality Western Yellow Pine

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The Hardie.

Here to Stay—

Raising fruit is one of the prominent industries.

It takes years to bring your orchard into the bearing stage. It then continues as a fruit producer for years.

It is wise under the circumstances to invest in durable orchard equipment that will give you long service.

The Time Saving—The Fruit Saving—are not the only features that everywhere make popular

The Hardie Orchard Line

The long life—the endurance under severe treatment appeal just as strongly. The combination of the best materials, proper design and skillful workmanship make possible not alone satisfactory service but years of it.

Our Orchard Supply Catalog tells all about this line. It is free.



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THE HARDIE MFG. CO.

55 No. Front St., Portland, Ore.

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HAVE YOU BOUGHT YOUR APPLE BOXES?

If not, our advice is to buy now. The present car shortage is causing slow shipments. As crop movement gets under way this situation is certain to grow worse.

We can furnish standard apple boxes, crates and cases of selected material, well manufactured. Standard or special shook to order.

Our prices are right. Write today for our list.

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perfect Dipper on the market today.

Economy, Speed and Efficiency, the three reasons for buying ours.

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proven even in a limited way that it
can be depended upon as a control
measure.

"My reason for bringing this to your
attention is that it might arouse some
other locality or district which has a
few of the leaf roller present, but not
a sufficient number to cause a great
amount of damage, and impress upon
their minds that it does not behoove
them to take a chance with these "fel-
lows," as they will not only de-foliate
the trees but also eradicate the crop
when they become numerous enough."

Growers Select Trade Name

The Oregon Growers' Cooperative
Association has selected its trade names.
The principal name to be used is Mist-
land. A second name which will be
used on some of its products, especially
on dried and canned goods, is Firland,
and a third name that will be used is
Truwest. These names are now being
registered. California has capitalized
the sun. Northwestern fruits are of
superior quality due to a happy combi-
nation of soil and climate. In every
valley of Oregon especially in the spring
and fall thin veils and banks of fog and
mist drift down against the hills. It
is a scene that every Oregonian is fa-
miliar with. Oregonians are often
afraid to mention the fact that we have
a little rain and mist occasionally. This
mist however, is one of the greatest
assets of the country west of the Cac-
cades and contributes to its richness,
its great output, and the high quality
of its fruits. Hence Mistland seems to
be a very appropriate name.

Drying Saves Cherries.

Within twenty-four hours after the
rain stopped on the morning of July
14th, cracked cherries were being pit-
ted and dried by the Oregon Growers'
Cooperative Association at the rate of
ten tons a day. A cherry pitter was in-
stalled at the dryer of Geo. W. Weeks,
two and one half miles north of Salem,
and operations started. A day later the
dryer of F. E. Evans was also in oper-
ation to handle the overflow. Cracked
cherries have been hauled from all
parts of the Salem district as well as
from Amity. At least 100 tons will prob-
ably be saved from total loss by pit-
ting and drying them.

To Direct Sutherland Plant.

J. O. Holt has secured Loyal V.
Emery of Sutherland to take charge of
the new plant which the Oregon Grow-
ers' Association recently purchased
from the Sutherland Fruit Products
Company. Mr. Emery is well and fa-
vorably known in the Unipqua Valley
and is one of the largest prune pro-
ducers in that section of the state.

Has Thirteen Hundred Members.

The Oregon Growers' Cooperative
Association, which now has 1,300 mem-
bers, with an acreage of 26,000 acres in
fruit, is making arrangements to an-
nounce to growers how the fruit will
be pooled and what the prices of the
fruit will probably be.

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ANCHOR Brand Velvet Flowers of Sulphur, also EAGLE Brand, and Fleur de Soufre, packed in double sacks, are the fluffiest and PUREST sulphurs that money can buy; the best for bleaching purposes, LEAVING NO ASH.

VENTILATED Sublimed Sulphur—Impalpable Powder, 100% pure, in double sacks, for Dry Dusting and making Paste Sulphur.

For LIME-SULPHUR SOLUTION, use our DIAMOND "S" BRAND REFINED FLOUR SULPHUR. We can furnish you this sulphur at such a low price that it would pay you to mix your own solution and net you a profit equal to the amount paid out for labor in spraying your orchard, even if you pay your men \$5 per day for making the solution and applying same.

To create additional available plant food, and prevent smut in grain, drill into the soil 110 pounds per acre of DIAMOND "S" BRAND POWDERED SULPHUR, 100% pure, or our COMMERCIAL POWDERED SULPHUR. This soil treatment has increased various crops up to 500%. Send for Circulars No. 6 and No. 7.

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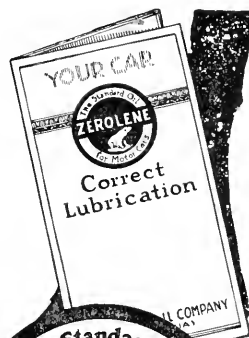
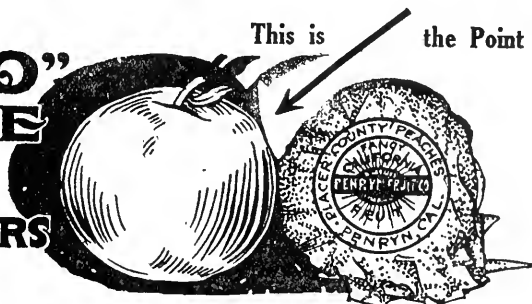
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Our Board of Lubrication Engineers has prepared a Zerolene Correct Lubrication Chart for your car. Get one at your dealer's or our nearest station. Use Zerolene for the Correct Lubrication of your automobile, truck or tractor.

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"Caro"
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Life of Fruit
Why?

Fruit decomposition starts from a bruise which opens tiny holes and permits the juice to escape and BACTERIA to enter.

"Caro" clings closely and dries up the escaping juice. "Caro" ingredients harden the spot, kill the BACTERIA, arrests the decomposition—and thus **PROLONGS THE LIFE OF FRUIT**. If your fruit is worth shipping it is worth keeping in best condition.

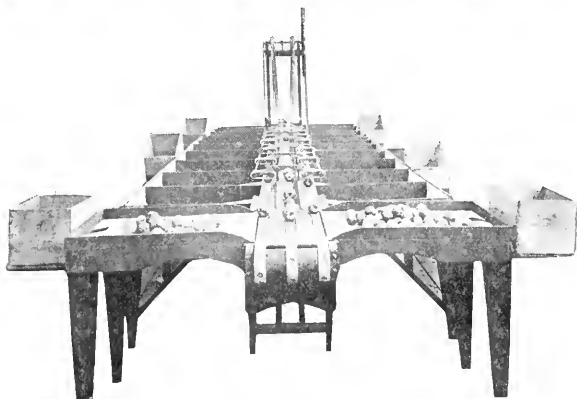
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Are the Two, Three and Four Grade

IDEAL FRUIT GRADERS



Never gets out of adjustment or causes any loss by bruising the fruit.

The sizing is by diameter or cheek measurement, the most perfect way fruit should be sized.

We build the Ideal Fruit Grader in six sizes to suit any need, from the largest growers and packing houses, who require a large output each day, to the individual grower with small tonnage.

We have designed our machine so there is absolutely no bruising of the fruit in any manner. The machine is very simple in construction, with nothing to get out of order or out of adjustment. Does not make the least noise, as there are no metal parts coming in contact with each other to cause a lot of wear and trouble.

The grading is done by elastic bands revolving crosswise of the belt that carries the fruit along the machine until it arrives at the proper bin, where it comes in contact with this elastic, which rolls it off gently into its proper bin without injury.

***It will do Perfect Work on Apples,
Pears, Peaches, Oranges or any
other fruit having similar shape***

This season's crop is such that we have had to double our stock to handle our orders, as we are replacing other machines of other makes, which have cost much more than what we are asking for ours.

It will pay you big to write us to get more information and prices before you buy, for our machine will prove very satisfactory, as it has to many others for the past few years.

We have one of the most complete shops with the best of machinery to build every part over a pattern to get them exact.

Write us for prices, stating your needs; then we will gladly quote you prices on any size machine you need.

We also carry in stock the Bryant Clamp Warehouse Truck, which will save you the price many times over each season in labor.

Write us and order early.

Ideal Fruit and Nursery Co.
HOOD RIVER, OREGON

Cover Crops, Tillage, Etc.

Continued from page 5.

With these few of the many advantages derived from the use of cover-crops in mind we will consider in brief their value as found from the standpoint of increasing the nitrogen content of the soil.

For our conditions in Montana experience has shown that humus is always needed, and while it may be secured by using a crop of oats, wheat or rye, it is also possible to secure nitrogen at the same time by using a leguminous crop. For this reason clover and peas have been selected as our best crops for use in building up the orchard soil.

At the Horticultural Substation in the Bitter Root Valley an experiment has been carried on since 1908 to demonstrate the value of cover crops of clover and peas to increase the nitrogen content of the soil. The system followed was to seed clover in May and plow under the fall of the following year. With the peas which were also sown in May the turning under was done the same fall. In order to successfully control the weeds it was found necessary to clean cultivate every third year. The part of the experiment where clover was used consisted of two plots of an acre each. One plot all the growth was plowed under, and on the other all the growth was removed. With the peas all the growth was plowed under. A fourth plot was used as a check plot and was clean cultivated continuously.

The first analysis was made in 1916 after the experiment had been in progress for eight years. The nitrogen content of the first two feet of soil in the plot which had been clean cultivated during this time was 1511 pounds, while that of the plot which had had the clover—tops and all—plowed under was 3019 pounds, or a variation of 1505 pounds. The comparison may mean more with the variation stated in terms of a common nitrogenous fertilizer. To bring the nitrogen content of the clean cultivated plot up to that of the plot which had been cover-cropped with clover would require an application of approximately 9406 pounds of commercial fertilizer.

The second clover plot which had been treated in the same manner but had had all the growth removed, leaving only the roots and some stubble, showed a total nitrogen content per acre of 2167 pounds or 882 pounds less than where no growth had been removed, and 653 pounds more than the clean cultivated plot.

The plot on which peas were used for a cover-crop showed a total content of 2375 pounds of nitrogen per acre or 861 pounds more than the clean cultivated plot and 644 pounds less than the plot

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in clover which had all the growth plowed under. As compared with the clover plot with all the growth removed there was a variation of only 208 pounds in favor of the peas.

The most interesting thing, however, and the point which prevents many orchardists from using cover crops, is the cost of the cover-crop seed. While I do not have the figures here the final result showed that the cost of clean cultivation was greater than where the cover-crops were used.

Last year samples of soil were taken again from the various plots, and while we are not able to give the results as yet, we anticipate important results from the tests.

The nitrogen content of the soil is not the only variation we have found in the work with cover-crops. The trees on the clean cultivated plot are a sorry looking lot, and many have either died or been badly affected with the so-called winter injury or "rosette" which is very common on soils deficient in plant foods. The trees on the cover-cropped plots are uniformly healthy and quite normal. The most important variation is that of the fruit production. The plot in clover where all growth was plowed under, and the plot in peas have produced the highest yields of fruits, and the clean cultivated plot the lowest. This was true in 1916 and is more marked in the records of the past three years since 1916. In the course of another year a second report will be prepared which will show some definite results, and from which some final conclusions may be drawn.

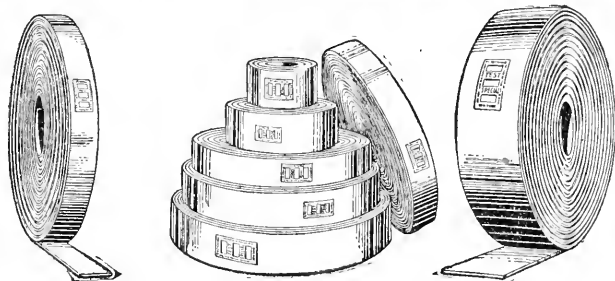
In this work no attempt has been made to increase the amount of potash or phosphoric acid, the idea being that these were present in abundance for the present at least. Reports from other stations show that the fertility of the orchard soil may be maintained by the addition of fifteen tons of barnyard manure per acre every three years. This is said to be able to take place of cover-crops from the standpoint of humus and in addition supply the amount of nitrogen, potash and phosphoric acid required to produce an annual crop of 160 barrels of apples.

The fertility problem which the orchardist of today faces is the same that confronts every other tiller of the soil. The only safe and sane method of soil management is that which returns to the soil an equal or greater quantity of plant food than which is removed by the annual crop, and by leaching and washing away. This and no other method will build up a permanent agriculture. When the measure of a successful farmer or orchardist is the maintenance or increase in the plant food content of the soil instead of his bank account, then will he pass from

the soil robber class which is not far from the bolsheviki, to that of the desirable citizen. While our experiments with cover-crops have shown beyond doubt that cover-crops, especially of the leguminous class, furnish a cheap and dependable supply of humus and nitrogen, we feel that in the not far distant future additions of potash and phosphoric acid will be profitable if not absolutely necessary.

As yet our experiments with commercial fertilizers have been too incomplete to draw conclusions from, but some desirable variations have been noticed and in the near future it is hoped that this work may have been extended considerably.

For the benefit of those who use or anticipate the use of peas as a cover crop, I might relate our experience in plowing this crop under. After two



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years of experimenting with various attachments on a fourteen-inch plow, and the use of much main strength and awkwardness, I conceived the idea that a little force applied to hold the plow in the ground to force the coulter to cut the vines might assist. To accomplish this I attached a riding attachment and a large riding rolling coulter to the walking plow. The latter was placed well forward on the beam with the point of the attachment as far behind

the center of the coulter as possible. The edge of the coulter was kept sharp by frequent grindings. Just previous to plowing the vines are disced down the way the land is to be plowed, as the coulter cuts better when they are in a solid mat. Two men are required for rapid work. One rides and drives, his weight preventing the coulter from riding over the vines, while the second follows and assists the obstinate bunches of vines under the furrow.

the location and extent of injury, the variety and the time and expense versus what you will have as a reward for your trouble.

"If however, the grower decides to save the tree do not at this time remove anything but dead or dying wood. No matter what shape the tree may have when this is done leave the remainder. Next winter corrective pruning may be attempted, but it is out of place now.

"Care must be exercised to avoid sun-scald where large limbs are removed. This is important. Keep the wounds painted and cover the trunk and main branches with whitewash in order to deflect the sun's rays as much as possible."

Methods of Saving Winter Injured Trees

IN a statement recently made to Hood River growers in regard to methods that should be pursued in handling winter injured trees, Gordon G. Brown, Horticulturist at the Hood River Experiment Station treats the subject in a way that is of value to all growers whose orchards were injured by low temperatures. It is explained that the so-called balance existing between the root system and the top was greatly disturbed by injury to the latter.

"The extent," says Mr. Brown, "to which the top has been injured varies all the way from almost nothing to as high as one hundred per cent. The killing back of so much tissue above ground, however, cannot be in all respects, likened to the removal of a similar amount of wood through the agency of pruning a non-injured tree. Were such the case, the wood growth on trees now making but feeble growth would be tremendous. The remaining tissue is also injured, which explains why a vigorous growth thus far has not resulted.

"It will be well to explain briefly how a tree functions and what lack of balance means. Last year the trees had a large leaf surface which was capable of supplying the requirements of a large root system. The root and top are said to be in balance as evidenced by heavy fruiting and lack of excessive wood growth. During the latter portion of the 1919 growing season the leaf system was manufacturing and storing up plant food for use during the 1920 season. This is the supply now being furnished by the root system, without which present growth would not be possible. Beginning with the formation of the terminal bud, the leaf system will again manufacture and store plant food for next year and the further maintenance of the root system. It is apparent, therefore, that as much leaf surface as can be maintained in vigorous condition should be encouraged this summer. Obviously no pruning which will remove leaves capable of functioning should be done. To do so would mean root starvation and an enfeebled tree.

"The above is not to be construed that no pruning at this season is advised. The removal of dead limbs has certain advantages well worth while. Such limbs are more easily detected by the average pruner now than during winter and can therefore be removed at less expense. Furthermore, on trees with fruit, the tendency for such limbs

is to scratch the fruit and lower its quality. The psychological influence on the grower in being rid of so many "eyesores" is likewise apparent.

"Let the grower decide now whether the tree is worth saving. Do not be influenced alone by the growth above the main crotch. Examine the trunk thoroughly. At a distance it may look fairly normal. Possibly it is girdled half way around. That means a gaping wound which may not heal over for many years or probably never. In the meantime it is subject to heart rot and similar troubles. Regular painting and disinfecting must be done to save such a tree. The writer doubts if it is worth while to save such a tree, especially if it is old. It can be done of course and a fair tree rebuilt, but it will probably never again become a first-class tree. The expense in rebuilding a tree is great in that much labor and time are expended before it comes into full fruiting again. Furthermore, it is doubtful whether it pays to save trees with impaired trunks, especially where a larger portion of one side of the top is dead. Such trees will require great care in rebuilding in order to induce proper shape. Therefore, in deciding whether to save a tree consider

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Northwest Fruit Notes from Here and There

OREGON.

The cherry crop at Mosier this year is reported to have been above the average in quantity and of fine quality.

A large tonnage of the Douglas County prune crop is said to have been contracted at 16 cents a pound.

The longest orchard in the world is stated to be that of the Dorfur Land and Orchard Company, seven miles from The Dalles. The orchard, which is largely apples, is nine miles in length and occupies 5,000 acres.

A small shipment of Gravenstein apples which arrived on the market in Portland from The Dalles July 15 is said to have broken the record for early fall apples. Veteran fruit dealers said that they had never seen this variety of Oregon apple on the market at this season of the year before.

D. F. Fisher, plant pathologist with the United States Department of Agriculture, who was assigned by the department to make an investigation of winter injury to fruit trees in the various sections of the Willamette Valley, recently stated that orchards in Marion County had made an excellent recovery since he first examined them in February. While some of the varieties of fruit trees that were injured will have to be taken out, the greater part can be saved by careful treatment. Marion County growers were warned by Mr. Fisher that winter-injured wood is subject to heart rot and advised the careful protection of all pruning wounds and cracks in the bark.

Cherry growers in the Willamette Valley sustained a considerable loss due to a rain in July, which fell for the greater part of a week in that section, causing the fruit to split and making it unsalable. Bings and Lamberts were the varieties that suffered the most damage. Some of the canneries continued to accept fruit that was not too badly injured. A large part of the crop had been picked and marketed before the rains came. The prices received by most of the growers was 13 cents per pound. In the Salem district where loganberries are grown extensively the rain is said to have done little damage to this fruit. The average price paid for loganberries in this district this year was 13 cents.

An interesting fact discovered recently by Leroy Childs of the Hood River Experiment Station was that the d'Anjou pear trees in that district were the most frostproof of any of the tree fruits grown in that district. Mr. Childs says that although most of these trees were set in tracts where one would expect the worst frost damage they emerged in better condition than any of the other trees.

According to J. O. Holt, manager of the Eugene Fruit Growers' Association, Lane County will harvest the largest crop of prunes in its history this year. In fact, the crop is expected to be so large that it is feared that the dryers now in existence in that district will not be able to handle it.

The Dalles cherry crop, which was one of the finest this year that has ever been harvested, resulted in highly profitable prices to growers. While many tons of fresh fruit was sold on Eastern markets, the local canneries purchased 500 tons, for which they paid \$300 a ton.

Denney & Co., fruit shippers and packers, have leased the building formerly occupied by the Rogue River Fruit Association at Medford and will conduct their business from the new plant in future. M. E. Root is the local manager in charge of the Denney interests in this district.

Carlot shipments of Hood River strawberries were limited this year to fifty-nine, or only about 60 per cent of the tonnage shipped last year. Continued late cold weather is said to have been the cause of the short crop. The average prices received, however, are reported to be the highest ever known, both for fresh fruit and from the canneries.

The Hood River Apple Growers' Association which has just closed its apple business for the past year announces that its total returns from all apples reaches \$2,686,986.88. It is estimated that this year's output of apples from Hood River will only reach fifty to sixty per cent of last year's tonnage, but that the fruit will be of exceptionally fine quality.

C. E. Stewart, county fruit inspector for Lane County, reports that fire blight has appeared in two orchards in that section in mahogany form. Steps have been taken by the county authorities to prevent its spread. Apple growers in Hood River County have also been notified by the local experiment station that this disease has appeared in orchards there in a mild form and instructions have been given for its treatment.

The Juniper Flat country near The Dalles, which for many years has been devoted to wheat raising is now becoming dotted with orchards, berry patches and diversified farms due to the fact that irrigation has been secured. In area the flat contains about 100 square miles.

The location for the model fruit farm which will be established near Albany to demonstrate how to raise fruit and berries desirable for canning it is stated will be chosen in the near future. The farm will be operated by the Puyallup & Sumner Fruit Growers' Association which owns a cannery at Albany.

WASHINGTON

Although the yield of cherries in the Grandview district this year was light it is estimated that it totalled over 170 tons. While the quality is reported very good the size of the fruit was a little below the average.

Information from Clarke County, is to the effect that the prune crop there is expected to exceed that of 1918 when it reached a total of over 13,000,000 pounds. Loss from the June drop this year was very limited. Up to during the early part of July about 500 tons of prunes had been sold at a price of 15 to 16 cents for 30-55s f.o.b. drier. The larger part of the crop however is being handled by the Washington Prune Growers' Association which closed its pool July 20 five days later than the Oregon Growers' Association. The Washington organization is building a large packing plant at Vancouver to handle its tonnage from 2,000 acres of prunes belonging to its members. It is expected that the plant, which is one of the largest and most modern in the Northwest will be completed by September first. The operations of the association are under the management of M. J. Newhouse who has as his assistant Edward J. Bodey.

Wapato is now said to have the largest and most modern dry storage warehouse in the Yakima Valley. The structure which belongs to the Pacific Fruit and Produce Company cost \$70,000 and is 200x155 feet. It is of concrete construction with a storage capacity of six hundred cars. This company maintains forty-three warehouses at different points in the state. John C. Koresky will have charge of the company's business in the Wapato district.

Among the activities of the Yakima Growers' Association is the continuation of their national advertising campaign for the third year. This will consist of the use of color pages in the prominent eastern magazines which are reaching millions of families in the United States. An improvement in the association's cold storage and warehouse facilities, is the erection this summer of a cold storage plant at Kennewick. With this new plant in operation the association will have a combined cold storage capacity of 750 cars.

An improvement in orchard machinery that has been attracting a good deal of attention in the Yakima country is the Fordson-Bean Tractor-Sprayer. The apparatus consists of a specially manufactured bean sprayer which is coupled to the rear of the tractor and obtains its power direct from the crankshaft of the tractor, in this way obtaining a very high pressure. The combined outfit can be turned in a radius of ten feet and the tank section when empty only weighs 950 pounds. It is claimed in sections where it has been demonstrated that the outfit apparatus has developed a high degree of efficiency and a very material reduction in the cost of spraying. One of its features is that the driver of the tractor can throw the pumps in and out of gear without leaving his seat.

Fire, believed to be incendiary, completely destroyed the storage and packing warehouse of the Entiat Growers' league at Entiat, Wash. The building was a wooden structure 200 by 288 feet in size, built four years ago and owned by the Cooperative Association of Growers connected with Skookum Packers' association. The loss to the building is \$25,000.

Fruit Picker



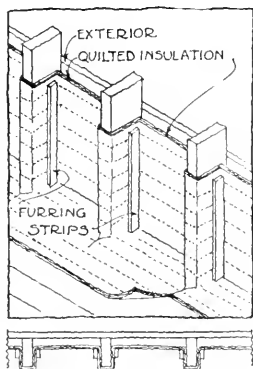
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and to the contents, \$50,000, fully covered by insurance.

The Yakima Valley Fruit Grower's Association has announced the closing of its 1919 Winesap pool. According to the records, 200,223 boxes were shipped bringing a net return of \$2.06 per box to members.

Frost proof apple warehouses at Grant Orchards, the Soap Lake station of the Great Northern Railway, 120 miles west of Spokane, and at Dalton, 40 miles east of this city, are announced by Charles J. Webb of the Spokane Fruit Growers' Company. Each will be 100x50 feet, with the second story for packing purposes and a receiving shed, fifty by fifty feet at one end. The storage capacity will be 35,000 boxes of apples, or forty carloads.

At Meyers Falls, residents have decided to erect a frost-proof warehouse fifty by one hundred feet.

Yakima cherry growers are now beginning to check upon the season's profits and find that, though the crop was light, higher prices more than made up for lack of quantity. Many growers made over \$1,000 an acre.

W. W. Scott, of Lower Naches, got \$3,000 gross for cherries from about 200 trees, which were planted on less than two acres; John Hamberg got \$1,065 from two acres of Bings. He reports the record of 17 cents a pound for his fruit. Lee Booth, Nob Hill, from four acres of comparatively young trees \$1,385.

The first apple shipment from the lower Yakima Valley was made by the Grandview Fruit & Storage Company. The apples were grown by S. C. Loop.

The Spokane Valley Growers' union will begin work at once on a \$50,000 addition which will double the capacity of plant at Opportunity and make it possible to handle 300,000 boxes of apples in 60 days this fall, according to Edward Pierce, manager.

Spokane business men and others connected with the cider making industry there are being interested in the establishment of a plant near the city for manufacturing apple cider by a new vacuum process of condensing recently patented and put in operation. The process is said to be a big advance over the methods heretofore used in this industry. O. H. Feilberg of the Spokane Cider Company, is chiefly interested in the new project and states that the company, when formed, will build a plant to cost \$25,000 for the building and machinery. A dryer for the pomace will be installed in the plant and the by-product sold for cattle feed and the peels and cores for jelly-making.

A fruit warehouse, costing \$50,000, will be erected at Fairfield, Wash., by the Palouse Fruit Growers' corporation, according to J. R. Wilson, treasurer and manager.

From reports of individual growers it is thought that unless something unforeseen happens at least 300,000 boxes will be harvested in the Deer Park orchard section northwest of Spokane. Evidence is clear, it is stated, that smudging saved the crop. While there are a few isolated instances of a fair crop in the smudged areas, there will be nothing like a full yield. In the sections where the smoke screen was resorted to the trees are loaded with fruit.

IDAHO.

Ninety per cent of the cherry crop in the Emmett section is signed up in the Emmett Cherry Growers' association, which was organized this season under the auspices of the Gem county farm bureau.

Yields from two Ada County fields treated with sulphur and land plaster have been measured and a substantial increase in crops was reported. A field treated with land plaster showed a yield of 10.69 tons of green hay, while a similar field, untreated, yielded only 6.76 tons. Treatment with sulphur resulted in a yield of 10.37 tons, as compared with 8.36 on untreated land.

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Several residents of the Lewiston Orchards community in Nez Perce County have used humus-making crops this season. The best of these is that of T. B. Gano, which consists of 10 acres of Bengalia field peas sowed at the rate of about 100 pounds to the acre. It is expected that a considerable acreage of hairy vetch will be sown this fall for a cover crop.

The Idaho prune crop is reported to give promise of being the largest in the history of the state.

What They Are Doing in California

The prices fixed for canning pears by the California Pear Growers' Association for this year are \$100 per ton for first grade and \$85 per ton for second grade fruit. These prices are \$15 per ton higher than those of last year. A short crop generally throughout the Coast region is given as the cause for the increase in prices.

Although plums, apricots and prunes were hurt in some localities in California by recent hot weather the damage to these crops as a whole is said to have been slight. Raisin and table grapes were more seriously affected.

A car of early peaches and plums was recently sold in the East for \$4,107 gross. This is said to be the highest price ever paid for these varieties of fruits to California growers.

The Sunsweet Standard, the official organ of the California Prune & Apricot Growers Association says that an opinion was reached recently at a meeting of the board of directors that a fair price for drying prunes will be \$12 per green ton and for apricots \$21 per green ton, together with the pits. These prices are made to establish a basis for those who dry these fruits for others.

On account of the fact that oranges in some sections of California are dropping heavily it is announced that it will be several weeks before an accurate forecast of the new crop can be given. The drop has continued later than usual and is spotted, being much heavier in some districts than others.

The Southern Pacific is urging California fruit shippers to load cars to the maximum. The company states that the cars will stand a considerably heavier load than is now being placed in them although the tonnage has been increased by more than two tons per car. By this action and greater promptness in loading and unloading it is hoped to give shippers a much better service.

Apricot growers who are members of the California Prune and Apricot Growers' Inc., the statewide cooperative selling association which claims to market 75 per cent of the prunes and apricots produced in California, will be paid from 18 cents to 32 cents a pound for their 1920 crop of dried apricots, according to prices recently named by the board of directors of the association. Though the tremendous export demand, which so strongly influenced last year's high prices has completely collapsed, according to G. G. Cockendall, general manager of the association, the association has been able to name a slightly higher average price for this year's dried apricots than last year.

Bits About Fruit, Fruitmen and Fruitgrowing

An apple crop report on the state of Washington, compiled by G. S. Ray of Spokane, agricultural statistician of the bureau of crop estimates, says that dropping from a condition of 85 per cent of normal on June 1 to 70 per cent of normal on July 1, the apple crop of Washington promises to be 15,217,000 bushels, as compared with the June 1 forecast of 17,056,000 bushels and the 1919 production of 19,136,000 bushels.

This year the United States is expected to produce 200,421,000 bushels of apples, based on July 1 conditions, while last year's crop totaled 144,429,000 bushels. The average condition of apples for the entire country dropped from 79.3 per cent of normal on June 1 to 70.7 per cent on July 1.

Fruit growers who have motor trucks or who are intending purchasing will be interested in the announcement that the International Motor Truck has just secured a site for like our Winter Nells in every way—is very

the erection of the largest motor truck plant in the world. The site of the new plant will be located at Fort Wayne, Indiana, and comprises 140 acres of land. The buildings of the new plant, it is stated will embody the improvements of every important modern automobile and motor truck plant in the United States. The company says that in doing this that it plans frankly to take advantage of other people's experience in building for manufacture on a large scale, with the motive in view of manufacturing the best truck in the world.

E. F. Benson, commissioner of the Department of Agriculture for the state of Washington, who recently visited the orchards in New Zealand in a letter to the agricultural bulletin says:

"Thirty-seven thousand acres now in fruit, with only one million people here, means that much will be exported, especially as thousands of acres of new orchards are being planted. Some of the fruit will compete with ours everywhere. I never tasted better Delicious apples than those grown in Hawkes Bay district and we are told that is not the best fruit district in the Dominion. In the Canterbury district we had Comice pears that should top any market in the world. The Winter Cole—much

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good, too. The Jonathan apples are most in evidence now. We think the flavor not quite equal to ours but it may well be that from some other district they may fully equal our best. They have all the pests we have and not as cold winters or as hot summers to help fight them, but the best skill is being used in mastering all their horticultural difficulties."

According to English apple exporters who have looked the situation over the market for American apples in Great Britain this year should show considerable improvement. Representatives of several of these firms who have been on the Coast express the opinion that the high prices which are obtained for American fruit in England will result in marketing

a greater quantity of better quality fruit there leaving the inferior stuff to be marketed at home.

Fearing an unprecedented car shortage apple growers in the east are reported to be taking steps to market a good deal of their fruit by motor truck lines. In many of these sections where the hauls are comparatively short it is believed that the ship by truck movement will work out very successfully.

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Weyman-Bronck Company, 1107 Broadway, New York City

Cannery Notes

The Oregon Growers' Cooperative Association recently acquired possession of the cannery and packing plant located at Sutherlin. The plant is a large one and in addition to the cannery is equipped with a prune drying and packing outfit, a juice plant and a lime-salt and plum manufacturing plant. The association is also building driers and packing plants at Carlton, Forest Grove, Riddle, Myrtle Creek and Sheridan. At Eugene where the plant of the Eugene Fruit Growers Association is located which is affiliated with the Oregon Growers' Association, the Eugene establishment has been greatly enlarged and is now one of the most complete in the Northwest.

The cannery of the Montesano Packing Company was opened recently for the season. The establishment expects to put up 1,000 cases of beans this year.

A cherry grower living at The Dalles, Oregon is reported to have marketed one motor truck load of cherries at a cannery there this year for which he received \$900.

The Silverton Canning Company, of Silverton, Oregon, is ready for operation. The plant of the company is a new one and is equipped to handle all kinds of fruits.

The Hillsboro Canning Company, of Hillsboro, Oregon, which has put its establishment into running condition at a cost of \$150,000 now has a plant that covers a space of ground 368 by 80 feet. The plant is equipped to handle a very large tonnage and expects to put up 30,000 cases of fruits this year.

The American Can Company has purchased a large building site in the manufacturing district of Portland, Oregon, and is preparing to erect a \$1,500,000 factory in that city. The building will be 89 feet wide by over 400 feet long, three stories high and will be constructed of reinforced concrete. The erection of the plant in Portland is due to the heavy demand for cans for canning purposes that has developed in the Northwest during the past two years.

Two new canneries in Skagit County, Washington, began operating this month. These are the Burlington Cannery Company, at Burlington, and the Skagit Canning Company at Sedro Wooley. A general line of fruits and berries will be canned by both and the cannery at Sedro Wooley expects to utilize both beets and string beans in addition. Both plants have gone to considerable expense to have their equipments modern in every detail. In addition to the above, the W. H. Pride Company, of Bellingham, and the Everett Fruit Products Company, of Everett, Washington, expect to buy considerable fruit in Skagit County and ship to their respective canneries.

That the inspection work recently started by the National Canners Association will be a great thing, not only for the canning industry in Oregon, but also for the housewives, is the opinion of Ernest H. Weigand, of the horticultural products department of the Oregon Agricultural College, who was recently appointed director of the inspection service of the association, in Oregon. A preliminary survey of 10 Oregon canneries has already been made under the direction of Professor Weigand—those of Newberg, McMinnville, Spring Brook, Gresham, Falls City, Lebanon, Junction City, Eugene Fruit Growers' Association, Creswell, and Boscung. The inspection is entirely voluntary on the part of the canneries which pay a certain fee per case for all cases packed. These canneries agree to live up to the rules and regulations of the inspection service, according to Professor Weigand. Eventually daily inspection will be made, adequate force being employed to handle the work. All fruit received at the plant will be inspected and the entire process of canning observed by the inspectors.

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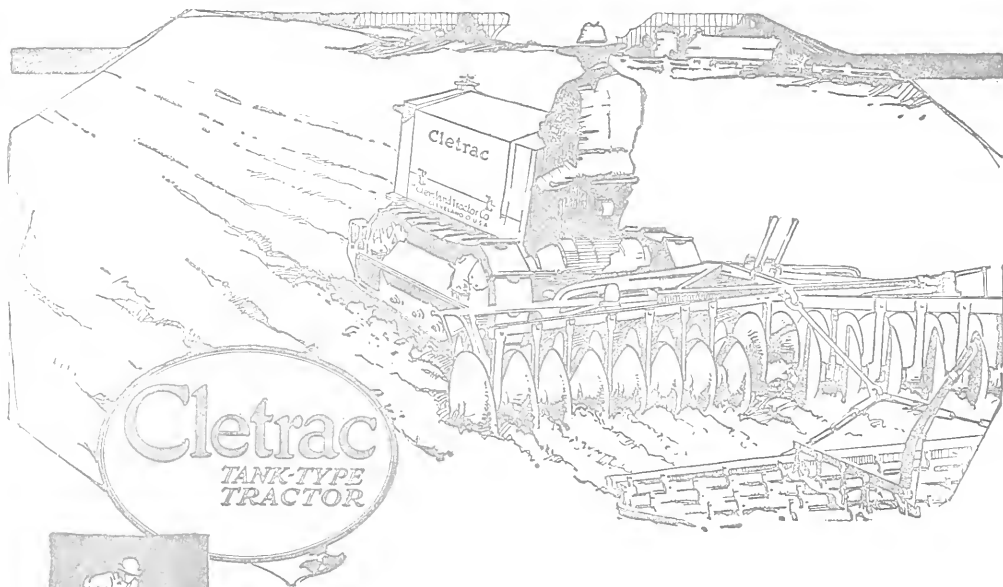
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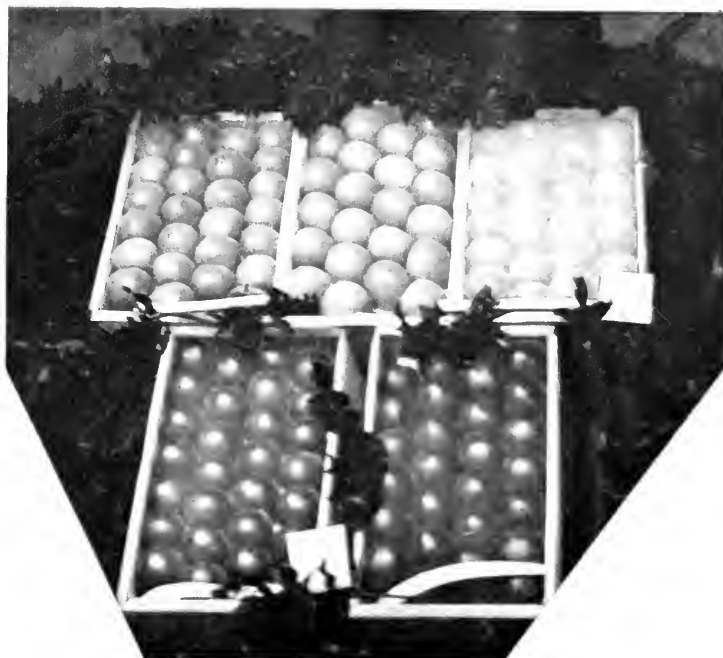
VOLUME XV

SEPTEMBER, 1920

NUMBER 3

Apple Packing Edition

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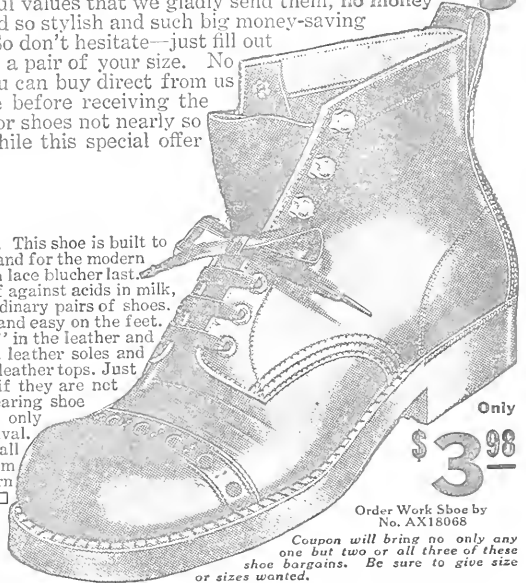
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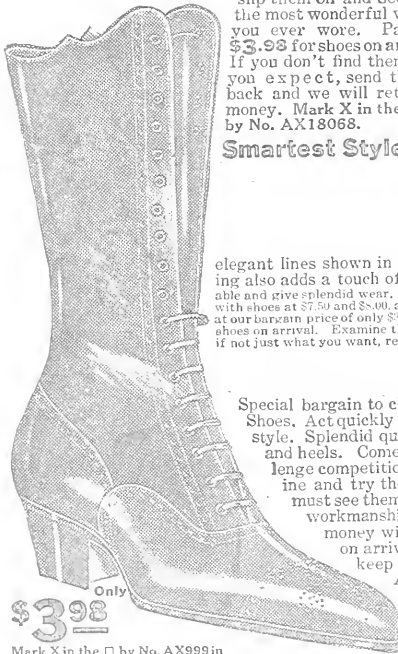
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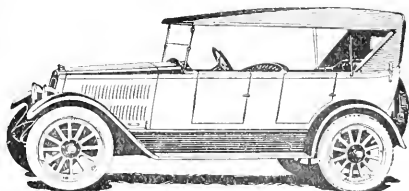
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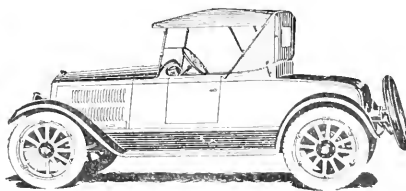
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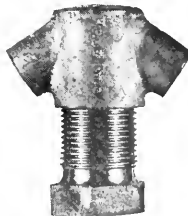
In opening these valves to the full capacity, there is absolutely no obstruction to interfere with the free flow of the water, and if the pipe should become filled with trash, the cap can be screwed off the valve and the obstruction removed without any difficulty. With the opening in the cap of the valve, the discharge can be thrown in any direction, or, in other words, at any degree of the circle surrounding the pipe. This enables the operator to run one or two streams, as desired, continuously day or night.

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of Modern, Progressive Fruit Growing
and Marketing.

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VOLUME XV

PORTLAND, OREGON, SEPTEMBER, 1920

NUMBER 3

Practical Hints on Packing Apples and Pears

By An Experienced Packer

GRADING apples is so closely related to packing that where it is possible a long step toward quicker methods of grading can be had by having the pickers do some of the grading in the orchard. This is possible where pickers are paid by the day, instead of by the box. Grading can then begin with the picking of the fruit from the trees.

Pickers, after having taken the fruit from the trees into pails, bags or other receptacles, should be required to empty them into the apple boxes, which are to be taken to the places for storing, not by pouring, but by hand, and then as though each fruit was an egg. During this transfer the picker could look for fruits badly blemished, and place them in boxes, in order that they may be gathered and disposed of as conditions require later. The fruit so assorted may then be stored in the place for receiving them, and left until such time as the owner is desirous of packing, at which time it could be carefully assorted in readiness for the packers.

In building a packing house, the opening between the storing room and packing shed should be made in the center of the side of the storing room, and not in the end of the building. By using the proper and most complete packing table all the materials needed in packing may be readily at hand and save considerable loss of the packer's time in waiting to be supplied with same. The packing tables should be equipped with proper and handy places for lining paper, layer board, wrapping paper, etc., and so arranged that the packer may have three different sizes before him at one time. For instance, while packer No. 1 is packing, say, 72, 112 and 125, packer No. 2 may utilize the three probable other sizes that No. 1 cannot then use—80, 88 and 96. As packer No. 1 completes one of his numbers he has but to notice the size about completed by No. 2, and if the contents of the tables used by No. 1 and No. 2 show a sufficient quantity of the sized apples used by No. 2 in completing his nearly finished box, No. 1 may then commence a box of the same size. In this way all the sizes may be kept cleaned from the tables

and a packing of the different sizes distributed to each packer in proper turn. Of course the most important feature of a successful packing crew is a perfect system. A complete system cannot be brought about by proper fixtures alone. In fact some very inconvenient packing sheds have, with careful thought of the foreman, brought out a system seemingly impossible to attain.

Packing is the classification of fruits into their proper sizes by placing the fruits of the same size solidly into boxes in such a manner as to insure uniformity of appearance, neatness and protection from bruising. The purpose of careful packing is to make the box of fruit attractive as possible, and thereby receive the highest possible price for it.

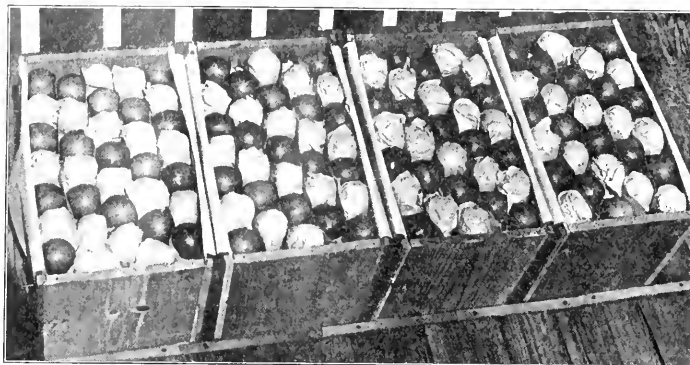
There were a number of different systems of packing in boxes followed on the Pacific Coast for a number of years, and this has brought about the adoption of a system that allows the packing of every size or shape of apple grown neatly and solidly in one sized box, the Northwest Standard ($10\frac{1}{2} \times 11\frac{1}{2} \times 18$, inside measurement, containing 2,176 cubic inches).

At this point I wish to warn the purchaser of boxes against improperly made boxes, for there is nothing so distasteful to the trade as a poorly manufactured box. Do not buy apple boxes with heads less than three-fourth inch in thickness. Do not buy boxes with sides less than three-eighths inch in thickness. Do not buy boxes with top and bottom board thicker than one-fourth inch, for these must be thin and springy. Do not buy boxes, unless the top consists of two pieces and the bottom of two pieces, with two cleats each for top and bottom. Do not use sides made of two pieces, even though tongued and grooved, for they are much weaker than single-piece material of the same thickness, and when a box is tightly packed will bulge, and as apple boxes should always be handled on the sides, when so handled will undoubtedly damage the fruit. This is also the reason for insisting on full three-eighths-inch thickness in these pieces.

In packing apples, the size of the apple is invariably determined by the

diameter of the apple from cheek to cheek at the widest point, never from stem to blossom, hence the reason why an apple should never be placed stem or blossom-end toward the sides of the box. Hardly an apple is absolutely circular in shape at its greatest cheek circumference, and it is here that the packer may take advantage of this irregularity in packing Ben Davis apples, one of the most difficult of apples to pack, for the reason that they are about the same distance from stem to blossom as from cheek to cheek, and will not, when turned, have brought about the results usually attained by turning in this manner. However, as before stated, if the packer will carefully save for the end of the boxes those in even a slight degree irregular and place at the ends so as to keep the apples lowest where they will not prove too high, and by the use of the more nearly circular ones through the center, a beautiful crown may be brought about.

In packing a two-two pack, start by placing one apple in the lower left-hand corner and the other in the center of the space left from the cheek of the apple placed in the corner to the opposite side of the box. This will leave a space on each side of the apple last placed of equal width. Settle firmly back into the spaces then left two more apples in exactly the same relative position on the other side of the box. Continue this until the opposite end of the box is reached, where there will be a space which, by a firm pressure downward and toward the packer, will enlarge the space sufficiently to permit of the last two apples being fitted snugly into place and at the same time take all of the extra slack out of the layer. Begin the second layer by placing the first two apples into the two little pockets formed by the spaces and the first four apples in the first layer, and continue to the end of the box as in the first layer, ending up with last two apples in the pockets similar to those at the beginning of the second layer. Continue to build up the third and fourth layers in the same way as the first and second, always placing the apple in the pockets formed and



1—A commercial pack of apples showing the fruit wrapped and unwrapped for exhibition purposes.

never directly over the cheek of the apple below (except, of course, where necessary in the straight pack, which is as little used as possible, as it is very likely to bruise the fruit and create a blemish).

Oftentimes, in order to keep the two-two pack from coming too high at the ends of the box on sizes ranging from 41 to 72, inclusive, particularly on the larger of these sizes, it is necessary, because of the length of the apple, to turn all the layers of the box so that the apples are either stem or blossom toward the top or bottom. Where apples are like the Wagener, or some of the other flat varieties it sometimes becomes necessary to turn a row or two at one end of each layer in order not only to lower the ends but to fill up in length the space yet left, alternating so that the rows turned with the stem or blossom toward the top or bottom of the box will be on layers Nos. 1 and 3, on the end of the layer farthest from the packer. The reason for turning in this way is that, until one layer is almost completed, it is hardly possible to know how many rows must be turned in each layer. This can be determined as the end of the first layer is reached, and the same number turned in each succeeding layer as above stated, first at one end and then the other. The reason for alternating the turning of the apples on each layer is that, should the nearest rows on each layer and the farthest be turned and the rest on edge, it would make the ends too low and the change from turned apples to those checked abrupt and unsightly, besides allowing the cover to rest only against the checked apples, and allow an opportunity for the flat ones to become loose in the box. No definite rule can be given for turning of apples in this way other than may be determined by trial of each variety. Should more than two rows be required to be turned it would either indicate that the packer was not making the rows fit snugly across the box or that the variety was decidedly flat and should be packed entirely on edge.

Never allow the apples in the rows to be loose from side to side of the box. This does not mean that they should be forced in so tight as to bulge the sides, but just tight enough that there will not be a space the thickness of a sheet of paper between them. Make the apples fit snugly across the box. The next greatest fault is not keeping the size of all the apples the same in each box. If you do not have the size of apple on the table that you are packing in the box either wait for more of the proper size or start the size you have on the table in another box.

Among other points for the beginner or the improperly taught to remember is never to load the packing table with too many boxes of apples at the same time. The more apples and the more sizes from which to choose the apple needed adds to the difficulty of choice.

The three-two pack is started with three apples across the end of the box, one in each of the corners nearest the packer and one in the middle. Then place an apple in each of the two pockets thus formed and then three in the pockets next formed until the end of the layer is finished. This layer may end three across or two across, as the case may be, determined by the size of the apple used. However, the next layer will

start with two apples placed in the pockets formed by the first five apples and space. Continue this until the box is completed.

Pear Packs.

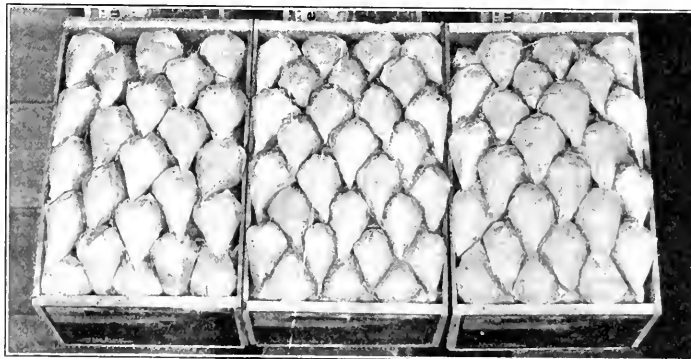
Pears are usually packed out in two grades designated as fancy and "C" grade and are packed in the standard pear box, 8½ inches deep, 11½ inches wide and 18 inches long inside measurement. The outside length of the box should be 19¾ inches. The packed boxes should weigh from 50 to 51 pounds gross.

In grading pears the fancy grade should consist of pears that are hand-picked, clean, sound and free from insect pests, sunscald, scab, scale or other diseases, worm holes, stings, broken skin, bruised, or evidence of frost by russetting, rough handling or other serious defects, excepting russetting covering a total area not exceeding one inch in diameter, excepting it be upon varieties which are naturally russeted more or less. Slightly misshapen or slightly rubbed fruit may be admitted to this grade. "C" grade pears consist of all fruit which does not meet the requirements of the fancy grade as to blemishes and deformities, but which in every way is sound and merchantable and free from disease.

In defining the regulations for packing pears, the Washington state grading rules state that the term "properly packed" shall refer to the arrangement and the amount of pears in each box. Pears to be properly packed shall be arranged in the box according to approved and recognized methods and all boxes shall be tightly filled but the contents shall not show excessive or unnecessary bruising as a result of the pressure exerted in lidding the box. Each packed box must show a minimum bulge of one-half inch on both top and bottom.

The most largely used standard pear packs are as follows:

Tier	Row	Style	No. in Box
Five	4-4	3-3	120
Five	5-4	3-3	135
Five	5-5	3-3	150
Five	6-5	3-3	165
Four	4-4	3-2	80
Four	5-4	3-2	90
Four	5-5	3-2	100
Four	6-5	3-2	110



2—A good commercial pack of pears.

Observations On the Evaporation of Prunes

From Investigations Made by C. I. Lewis, F. R. Brown and A. F. Baras for the Oregon Agricultural College

IN the evaporation of prunes certain terms are generally used which may not be well understood by growers who are engaging in the work for the first time. A brief definition of these terms will probably prove helpful to such people. "Drying time" is figured from the time the fruit is placed in the heating chamber to the time it is removed as dried fruit. "Weight per bushel" refers to the number of pounds of dried fruit from sixty pounds of fresh prunes. "Size" refers to the number of dried prunes it takes to make a pound, such as 30-40's, 40-50's, etc. "Drying percentage" is the relative amount of dried fruit that is obtained from a given amount of fresh fruit. "Dobies" are prunes which dry more slowly than most of the fruit on the tray and have to be re-dried. "Bloaters" are prunes which puff up until the skin becomes very tight so that they often explode and are worthless, examination showing that nothing is left but skin and pit. They are apt to have a burned or scorched flavor. "Dripping" refers to an accumulation of thick sirup which oozes from the fruit during the process of evaporation, generally caused by using unripe fruit and by improper methods of evaporation. Too high a temperature at certain stages of evaporation may be partly responsible. Poor ventilation is also a factor. "Sweating" refers to the placing of prunes in piles or bins and allowing them to remain until the entire mass has a uniform moisture content. "Sugaring" refers to the accumulation of a white or sugary substance on the outside of the fruit. "Frogs" are cured prunes which are very much misshapen, probably due to the fruit being unripe. "Processing" refers to the steaming of the prunes just before they are packed in the boxes for market. It is a cleansing, softening process and facilitates proper packing.

Buildings for Evaporating Prunes. No hard fixed rules can be formulated which will apply in detail to all buildings used for the evaporation of prunes. Every grower must study his own evaporator carefully, so that he may know under what conditions he can secure certain temperatures, certain air circulation, and a combination of factors which will turn out a high-grade fruit. What might apply to one building might not to another. There are certain fundamental principles, however, that apply to all buildings. For instance, lack of ventilation or air circulation would have the same effect regardless of where the prunes are dried. The use of abnormally low, or abnormally high temperatures would have the same influence in any building, as far as the type of product turned out is concerned. Prunes require a great deal of air, which should move at the rate of at least 600 feet a minute. They should have a starting temperature of about 130 to 145 degrees, and a finishing temperature not higher than 160 degrees. A high humidity should prevail until the

fruit is thoroughly heated, then the humidity should be gradually decreased until it is a little less than the percentage of moisture desired in the finished product. It is well to have the tunnels thoroughly heated before the fruit is introduced. Some growers claim that they start prunes at as low a temperature as 90 to 115 degrees. We doubt, however, the wisdom of such a practice, for with such temperatures rapid fermentation of fruit may take place, which means a loss of sugar and a deterioration of the product. Certain molds may form at the lower temperature and brown rot can work under such conditions. We have not carried on sufficient experimental work to state arbitrarily just what temperatures are always best, but our results do show, and our observations with many growers indicate, that the temperatures we have advised produce splendid results. It must be remembered that warm air will absorb more moisture than cold air; that if you have a large volume of hot, dry air, moisture that is given off from the fruit will be absorbed very rapidly. Just how much moisture the air can hold and still be of value in prune drying, is a subject needing much investigation. Many tunnels are so long that the air when it reaches the end of the tunnels is practically valueless for evaporating purposes, as it is practically saturated with moisture, and giving out moisture rapidly into the air tends to cool it and thus reduce the moisture-holding capacity. As the prunes are nearing the time when they are ready to be taken from the trays, they gradually become hot. If, however, they are allowed to become too hot before they are really finished, the cells may rupture and leak, and dripping will take place.

Thermometers. Much of the poor work in evaporation of prunes is due to the fact that the grower is using a poor thermometer. Cheap thermometers should not be used in prune evaporation. It would pay all growers to use some self-recording thermometer which would record the temperature during the entire twenty-four hours. Such a thermometer will easily indicate what happens when the night worker goes to sleep, and will be an aid in explaining many of the poor results obtained.

Air circulation is extremely important. Good air circulation and proper ventilation must prevail at all times. It is possible to have too rapid circulation and to have the ventilators draw out the air too quickly. For example, in evaporating vegetables, it is very desirable to have the air move rapidly at a relatively low temperature of about 140 degrees. These results are obtained by blowing air over steam pipes and causing it to move rapidly over the vegetables. Some fresh fruits should be dried in this same way. The aim is to have the product when finished resemble, as much as possible, the undried product. With prunes, however, the

aim is entirely different. We are really after a cured fruit. While it may be desirable so to handle the evaporator that a high-class product may be turned out in the shortest time, yet we must not make the mistake of attempting to evaporate the prunes so rapidly that an inferior product is the result. Certain changes are taking place in the prune during the process of evaporation. Sugar is forming rapidly and will do so unless the temperature is forced too high on the one hand, or allowed to remain too low, on the other. It is very important to have all the factors influencing drying under the complete control of the operator and influenced as little as possible by outside conditions and climatic changes.

Weather exerts a marked influence on the weight of the fruit obtained from each bushel and on the drying percentage. The influence of weather is well shown in Table I.

TABLE I.—WEIGHT OF FRUIT AS INFLUENCED BY CLIMATIC CONDITIONS.

Year	Weight per bu. Lbs.	Drying percentage
1911—Rainy	17.90	28.33%
1912—Dry	19.89	33.15%
1913—Dry	20.30	33.83%
Maximum in experimental work for 1913	21.40	40.07%
1914—Rainy	17.95	28.41%
Maximum in experimental work for 1914	20.25	33.76%
Average for rainy weather	17.62	28.37%
Average for dry weather	20.00	33.49%
Loss due to rainy weather	3.07	5.12%

The seasons of 1911 and 1914 were much alike. They were both rainy at the beginning of the season and strong southwest winds prevailed. Such conditions are unfavorable to the evaporation of prunes. During the seasons of 1912 and 1913, however, almost ideal climatic conditions prevailed for good evaporation. The average sugar content for 1913 was 15.28 per cent and that of 1914, 12.45 per cent. This will account for some of the difference in weight of prunes, the remaining difference probably being due to weather conditions. From our investigations extending over a number of years, we find that there is a loss ranging from five per cent to nine per cent in the drying percentage due to unfavorable weather conditions. If climatic conditions had been such that the prunes had thoroughly matured, having a very high sugar content, less time would have been required to dry, there being a high drying percentage. This is one reason why Petites dry more quickly than Italians; another reason is because they are a smaller fruit. Investigations will show that some years prunes contain much more moisture than others, are less mature and contain less sugar, and therefore require a longer drying time.

Moisture Content. The question is often asked as to how much moisture prunes should contain after they are evaporated. In our experimental work we have accepted seventeen per cent to eighteen per cent as the proper moisture content. In some cases it has run as

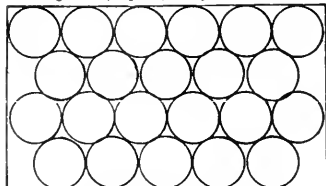
(Continued on page 29.)

Better Fruit's Standard Apple Packing Chart

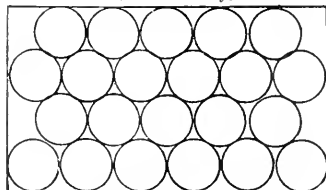
All packs to go in the Northwest Standard Box— $10\frac{1}{2} \times 11\frac{1}{2} \times 18$ inches inside measurement

THE apple grading rules and regulations used in connection with the packs illustrated below are the new ones adopted for 1920 by the State Agricultural Department of Washington and are largely the same as those that are used in Oregon, Idaho and Montana with slight variations in the grading. All the packs here described are for the standard apple box measuring $10\frac{1}{2} \times 11\frac{1}{2} \times 18$ inches inside measurement. A description of all packs not illustrated can be found under the heading "Apple Packs."

Diagonal 2/2 pack, 4 layers, 88 apples



First and third layers

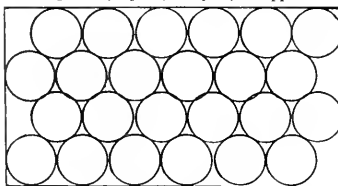


Second and fourth layers

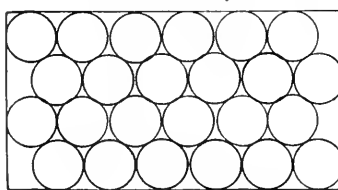
It will be noted that we have added to our apple packing chart this year illustrations of the 200 and 225 which are what are known as straight packs and the 125 diagonal pack. The 125 pack is now being much used for long apples like the Spitzenberg, Delicious and Ortle.

The principal changes in the grading rules are in raising the color requirements of some of the solid red varieties and in placing some of the other varieties under a new classification.

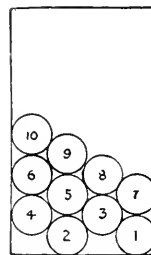
Diagonal 2/2 pack, 4 layers, 96 apples



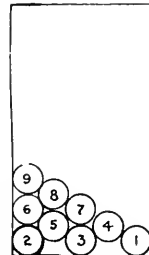
First and third layers



Second and fourth layers

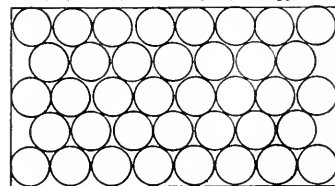


How to start a 2/2 diagonal pack

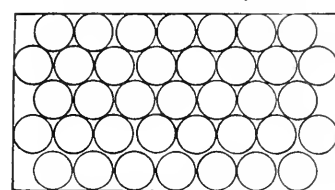


How to start a 3/2 diagonal pack

3/2 pack, $4\frac{1}{2}$ tier, 5 layers, 188 apples



First, third and fifth layers



Second and fourth layers

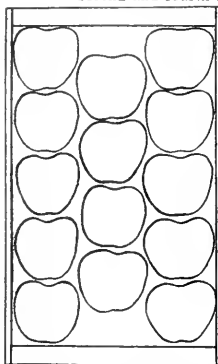


Figure 1—41 apples

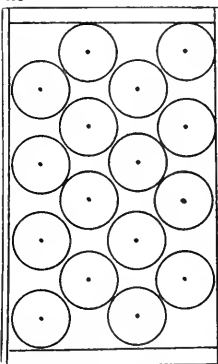


Figure 2—64 apples

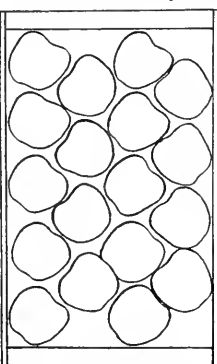


Figure 3—72 apples

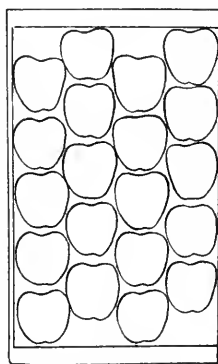


Figure 4—80 apples

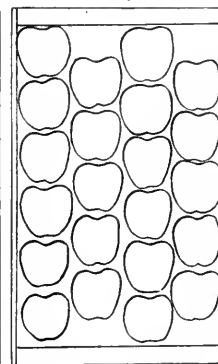


Figure 5—88 apples

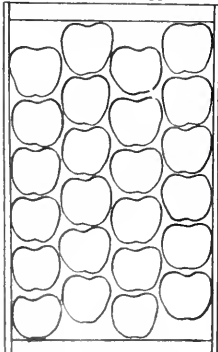


Figure 6—96 apples

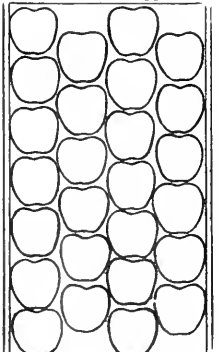


Figure 7—104 apples

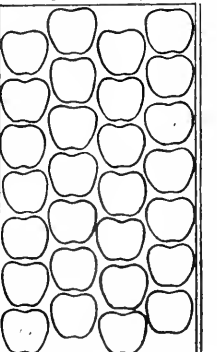


Figure 8—112 apples

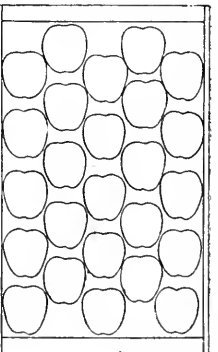


Figure 9—125 apples

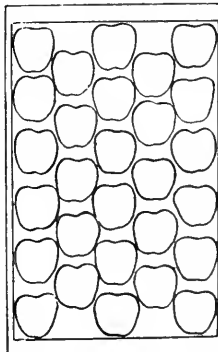


Figure 10—138 apples

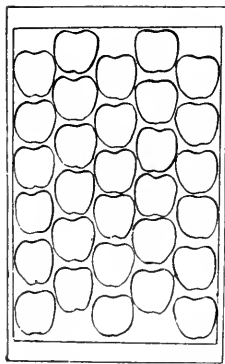


Figure 11—150 apples

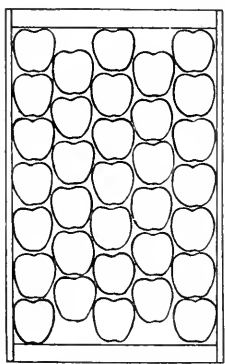


Figure 12—163 apples

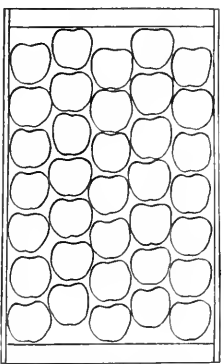


Figure 13—175 apples

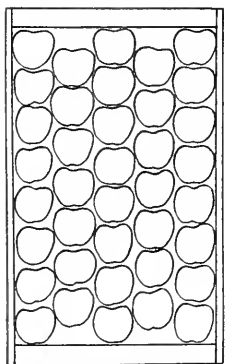


Figure 14—188 apples

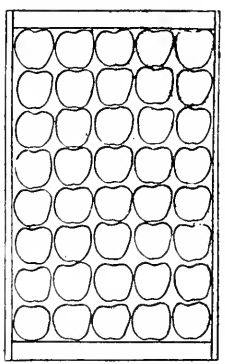


Figure 15—200 apples

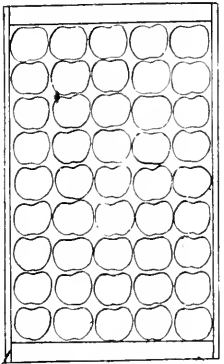


Figure 16—225 apples

Apple Grading Rules—Season 1920

Extra Fancy—Extra Fancy apples are defined as sound, mature, clean, hand-picked, well-formed apples only, free from all insect pests, diseases, blemishes, bruises and holes, spray burns, limb rub, visible watercore, skin punctures or skin broken at stem, but slight russetting within the basin of the stem shall be permitted.

Fancy Grade—Fancy apples are defined as apples complying with the standard of Extra Fancy Grade, except that slight leaf rubs, scratches, or russetting shall be permitted up to a total of ten per cent of the surface, and provided that scab spots not larger than one-quarter inch in diameter in the aggregate shall be permitted in this grade.

"C" Grade—"C" grade apples shall consist of sound, mature, hand-picked apples which are practically free from infection, bruising or broken skin and which are not badly misshapen, provided that two healed worm stings, slight sun scald, and scab up to a total of one-half inch in diameter shall be permitted in this grade.

Combination Grade—When Extra Fancy and Fancy apples are packed together the boxes must be marked "Combination Extra Fancy and Fancy." When Fancy and "C" grade apples are packed together the box must be marked "Combination Fancy and 'C' Grades." Combination grades must contain at least 25 per cent of apples which are of such grade as would be permitted in the higher grades. None of the higher grade apples shall be sorted out of any lot and the remainder packed as combination grade.

Orchard Run—When Extra Fancy, Fancy and "C" grade apples are packed together the boxes must be marked "Orchard Run," but Orchard Run apples must not contain any fruit that will not meet the requirements of "C" grade. It shall be unlawful to remove any of the higher grade apples from any lot and then pack the remainder as "Orchard Run."

Unclassified—All firm apples which are practically free from infection but which do not conform to the foregoing specifications of grade, or if conforming, are not branded in accordance therewith shall be classed as "Unclassified," and so branded, provided, that no restriction shall be placed on the number of worm stings admitted to this class. Open

worm holes will not be permitted. This grade must be plainly marked with the word "Unclassified."

COLOR REQUIREMENTS

Apples shall be admitted to the First and Second grades, subject to the following color specifications. The percentage stated refers to the area of the surface which must be covered with a good shade of red.

SOLID RED VARIETIES

	Extra Fancy	Fancy
Aiken Red	25%	25%
Arkansas Black	75%	25%
Baldwin	75%	25%
Black Ben Davis	75%	25%
Detroit Red	75%	25%
Gano	75%	25%
King David	75%	25%
Red June	75%	25%
Spitzenburg	75%	25%
Spitzenburg Kaiga	75%	25%
Vanderpool	75%	25%
Winesap	75%	25%
Jonathan	66%	25%
McIntosh Red	66%	25%

STRIPED OR PARTIAL RED VARIETIES

	Extra Fancy	Fancy
Delicious	66%	25%
Shayman Winesap	66%	25%
Black Twig	50%	15%
Ben Davis	50%	15%
Bonum	50%	15%
Farmette	50%	15%
Geniton	50%	15%
Hulbardston	50%	15%
Limbertwig	50%	15%
Missouri Pippin	50%	15%
Northwestern Spy	50%	15%
Ontario	50%	15%
Red Astrachan	50%	15%
Rainier	50%	15%
Rome Beauty	50%	15%
Salome	50%	15%
Stark	50%	15%
Sutton	50%	15%
Willow Twig	50%	15%
Wagoner	50%	15%
Wealthy	50%	15%
York Imperial	50%	15%
Alexander	25%	10%

Chenango	25%	10%
Gravenstein	25%	10%
Jellies	25%	10%
King	25%	10%
Oldenburg	25%	10%
Shawassier	25%	10%
Twenty Ounce	25%	10%

* No color requirement on Fancy Rome Beauty 96 and larger.

RED CHEEKEE OR BLUSHED VARIETIES

Extra Fancy—Perceptibly blushed cheek.

Fancy—Tinge of color.

Hydes King

Maiden Blush

Red Cheek Pippin

Winter Banana.

GREEN AND YELLOW VARIETIES

Extra Fancy—Characteristic color.

Fancy—Characteristic color.

Grimes Golden

Yellow Newtown

White Winter Pearmain

Cox's Orange Pippin

Ortley

Yellow Bellefleur

Rhode Island Greening.

SUMMER AND EARLY FALL VARIETIES

Summer varieties such as Astrachan, Bailey's Sweet, Belding, Duchess, Early Harvest, Red June, Strawberry, Twenty Ounce Pippin, Yellow Transparent and kindred varieties, not otherwise specified in these grading rules, together with early fall varieties such as Alexander, Blue Pearmain, Wolf River, Spokane Beauty, Fall Pippin, Waxen, Tolman Sweet, Sweet Rough and other varieties not provided for in these grading rules, as grown in sections of early maturity, shall be packed in accordance with the grading rules covering Fancy Grade as to defects but regardless of color.

All apples packed otherwise than according to the foregoing rules shall be accompanied by a printed description of the contents of each package.

APPLE PACKS

Style of Pack:	No. in Box
2x1 diagonal pack 5x5 long, 3 tier deep..	45
2x1 diagonal pack 5x6 long, 3 tier deep..	50
2x1 diagonal pack 3x3 long, 4 tier deep..	48
2x2 diagonal pack 3x4 long, 4 tier deep..	56
2x2 diagonal pack 4x4 long, 4 tier deep..	64
2x2 diagonal pack 4x5 long, 4 tier deep..	72
2x2 diagonal pack 5x5 long, 4 tier deep..	80
2x2 diagonal pack 5x6 long, 4 tier deep..	88
2x2 diagonal pack 6x6 long, 4 tier deep..	96
2x2 diagonal pack 6x7 long, 4 tier deep..	104
2x2 diagonal pack 7x7 long, 4 tier deep..	112
2x2 diagonal pack 7x8 long, 4 tier deep..	120
2x2 diagonal pack 4x5 long, 5 tier deep..	113
3x2 diagonal pack 5x5 long, 5 tier deep..	125
3x2 diagonal pack 5x6 long, 5 tier deep..	138
3x2 diagonal pack 6x6 long, 5 tier deep..	150
3x2 diagonal pack 6x7 long, 5 tier deep..	163
3x2 diagonal pack 7x7 long, 5 tier deep..	175
3x2 diagonal pack 7x8 long, 5 tier deep..	188
3x2 diagonal pack 8x8 long, 5 tier deep..	200
3x2 diagonal pack 8x9 long, 5 tier deep..	213
5 straight pack 8 long, 5 tier deep..	200
5 straight pack 9 long, 5 tier deep..	225

DIMENSIONS OF STANDARD APPLE AND PEAR PACKAGES

The standard size of an apple box shall be 18 inches long, 11½ inches wide, 10½ inches deep, inside measurement.

Pear—18x11½x8½ inches, and outside length 19½ inches.

3½-inch suitcase pack Peach-Plum—18x11½x8½ inches.

DIMENSIONS OF APPLE BOX MATERIALS

Ends—3½x10½x11½, 2 pieces, 20 to bundle.

Sides—3½x10½x19½, 2 pieces, 40 to bundle.

Top and Bottom—1½x5x19½, 4 pieces, 100 to bundle.

Cleats—3½x3½x1½, 4 pieces, 100 to bundle.

Thirty-two 6d nails commonly used per box.

RULES FOR ESTIMATING PAPER AND CARDBOARD

Apples and Pears.

Wraps for packing 100 boxes, 50 pounds.

Lining for packing 100 boxes, 7½ pounds.

Cardboard for packing 100 boxes (apples), 16 pounds.

RULES FOR USE OF PAPER

Apples.

Use 8x8 for 188-200-213-225 Packs.

Use 9x9 for 175-163-150-138-125-113 Packs.

Use 10x10 for 150-135-120-110-100 Packs.

Use 11x11 for 80-72-64-56 Packs.

Use 12x12 for 50-48-41-36-32 Packs.

Pears.

Use 8x8 for 120-228-215 Packs.

Use 9x9 for 193-180-165 Packs.

Use 10x10 for 150-135-120-110-100 Packs.

Use 11x11 for 80-72-64-56 Packs.

CEMENT COATED NAILS

Per keg: 4d, 55,000; 5d, 39,700; 5½d, 34,000; 6d, 23,600.

Utilizing Baskets for Apple Shipments

THE shortage and high prices of boxes as containers for packing apples during the past two years has caused growers in some sections of the Northwest to utilize some other style of package. One of the methods resorted to which is said to have proved satisfactory is the use of baskets. While baskets have been employed in shipping peaches from some of the Western states for some time it is only comparatively recently that they have been used for apples in the Northwest.

In using baskets for shipping apples Idaho has taken the lead and last year shipped a large quantity of fruit in this way. This year with a still greater shortage of containers and higher prices for boxes it is expected that a wider use of baskets will result and that other states are likely to use large quantities of them. Last year eight carloads of fancy apples were

shipped in baskets from the Payette valley, which growers had no trouble in disposing of at satisfactory prices. Thirty cars were shipped from the Boise valley and 15 acres of 6,000 empty baskets to the car were utilized at Parma, Council, Twin Falls and other points in Idaho.

By properly piling the baskets five tier high it is said to be possible to ship 600 packed baskets of apples to the car. In some instances the grading and packing of the apples was done in the orchards doing away with the expense of hauling and handling in the packing house.

While packing apples in baskets in Oregon and Washington has been very limited so far, reports from the latter state are to the effect that they will probably be used to some extent there this year. In fact there has been a considerable tendency among growers

in some of the states to try shipping some of their apples in bulk due to the shortage of containers. In view of this, baskets which can be obtained for about the same price as boxes this year may prove a big help in moving the Northwest apple crop.



Jonathan apples packed in bushel baskets ready for shipment at Fruitland, Idaho.

Your Apples Won't Freeze

NEITHER WILL YOUR OTHER FRUIT OR POTATOES

IF YOU USE

Cabot's Insulating "Quilt"

IN YOUR STORAGE HOUSES

The Most Efficient Insulator, as Proved by the Tests of the United States Government, Bureau of Standards

(Ask for copy of report of test)

Cold and Heat-proof, Rot-proof, Vermin-proof, Fire-resistant

Cabot's Quilt is a thick, resilient matting of cured eel-grass quilted between sheets of wonderfully strong Kraft paper. The eel-grass has a tough, flat fibre that forms thousands of dead-air spaces, making an insulating layer that the tests proved was superior even to cork board, which now costs over five times as much.

For further information and details of proper construction write or see

TIMMS, CRESS & CO., Distributors
PORTLAND, OREGON

Jobbers and Dealers in Building Materials, Building Papers, Roofing, Perfection Plaster Board, Cabot's Conservo Wood Preservative, Cabot's Creosote Shingle Stains

Our Advertisers

In the raising of fruits, as in any other business, one must have a certain amount of equipment.

There are tools for cultivation, for spraying, for harvesting and packing, without which the orchardist cannot hope to compete for success with his more progressive neighbor, who possesses this equipment.

In accepting advertising for BETTER FRUIT we have endeavored to be sure that the articles are as advertised. We feel, therefore, that our readers are safe in buying from any of our advertisers.

You will find the advertising columns of BETTER FRUIT an interesting and helpful directory of the most modern orchard equipment and materials necessary to the fruitgrower.

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OF
• OREGON •

—is maintained by the state in order that the young people of Oregon may receive, without cost, the benefits of a liberal education.

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High standards of scholarship are made possible by an able faculty, well equipped laboratories and a library of nearly 100,000 volumes.

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With a heightened confidence gained by the recent expression of public support, the University is now entering upon an era of large development and extended usefulness.

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Operating Air-Cooled Apple Storage Houses

By H. J. Ramsey and S. J. Dennis, of the U. S. Department of Agriculture

PROPERLY grown, matured, and handled fruit can not be held in good condition for the maximum length of time in storage unless it is cooled with some degree of promptness. Neither can it be stored for the maximum length of time unless it is held under favorable storage temperatures and conditions. The two factors of promptness of cooling and the maintenance of proper storage temperatures are inseparably associated with both the construction and the management of air-cooled storage houses. These are the two factors for which the manager of the storage

house is primarily responsible. If the grower is also the manager of his own common storage house, full responsibility for the condition of the fruit in storage must necessarily devolve on him. If, however, the common storage house is managed by an association or by some one other than the grower, the responsibility for the keeping quality rests both with the grower and the storage-house manager. When the apples are grown, harvested, and stored by a single individual, there is no question as to who is responsible for every act that tends to prolong or shorten the life of

the fruit. If, however, there is a division of labor, one man growing and harvesting and another storing the fruit, then there is always a question as to what may have caused the loss in storage and who was responsible for it.

Inefficient management of storage houses results usually in the very slow cooling of the fruit and the maintenance of temperatures anything but desirable. All the money invested in the orchard enterprise and all the care exercised in growing and harvesting the crop may be wholly wasted by inattention to the details of proper storage-house management. It is therefore evident that if air-cooled storage houses are to be successfully employed it is essential that proper attention be given to both construction and management, in order to preserve the keeping quality that the fruit possesses at the time it is placed in storage.

The efficiency of a common storage house will depend primarily upon the rapidity which the fruit is cooled and the storage temperatures maintained. A common storage building, therefore, must necessarily provide for two things—the freest circulation and intake of cold air during the night or the cooler periods of the day and the conservation of this cold air by closing all hatches and intakes before the outside temperature begins to rise and by preventing the leakage of heat through the walls, floors, and ceilings of the building. For the intake of cold air, openings should be provided at or near the ground or the lower part of the building, while air shafts leading upward from the ceiling of the storage chamber or chambers should be provided to carry off the warm air. To prevent the leakage of heat into the building, the walls, ceilings, and floors must be insulated. As these two factors govern to a considerable extent the rapidity of cooling and the maintenance of low temperatures, the importance of ventilation and insulation can hardly be overestimated. No other two factors of construction or operation are of greater importance. Upon these depend in the final analysis the success or failure of the common storage house.

The circulation of air in a common storage house is usually secured through natural ventilation induced by the difference in the weight of air at different temperatures. Air when warm expands and occupies a greater amount of space than when cold. The weight of a cubic foot of warm air is less than the weight of a cubic foot of cold air. When the air inside of the building is warmer than that outside, the cold outside air, by reason of its greater weight, flows in through the openings at the lower part of the building. This incoming colder air pushes out the warmer and lighter air

[This is one of a series]

Clean and Safe

These are requisites in spray materials,
They are practical details of manufacture and technique.

ZENO

Is clean to handle, safe to apply.
It will not hurt the hands or face of the operator,
Nor the skin of horses.
It has been used for years in parks,
On tough and tender trees and shrubs,
Much more difficult to spray than orchards.
It is used to control scale, aphids, mealy bug,
Red spider—to clean the tree of black smut,
Moss and lichen.

ZENO

Is an internationally used
Miscible oil spray, and these are reasons why
It has proved the best by years of test.

MANUFACTURED ONLY BY

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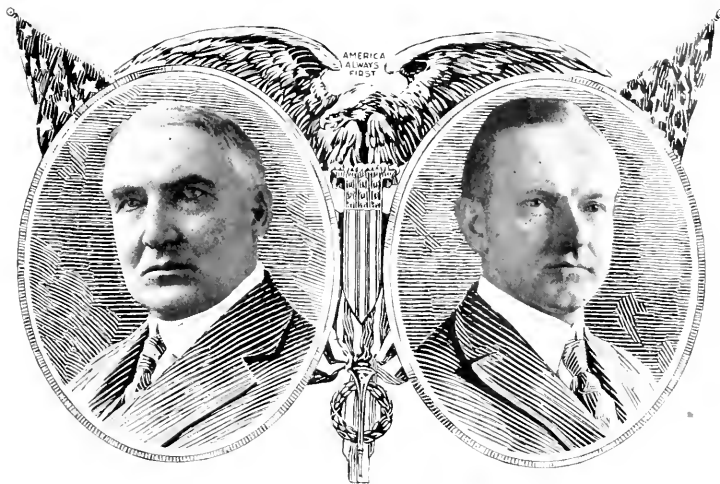
T. O. McCLURE, Director of Research

[Zeno may be had of your local Distributor, Fruit Company,
Exchange, or by writing to us direct]

SPOHN & WING, Northwest Agents
223 Sherlock Building, PORTLAND, OREGON

For President
Warren G. Harding

For Vice-President
Calvin Coolidge



The Republican Party and the Farmer

YOU farmers of America have more at stake in this election than any other element in our citizenship.

You have borne more than your full share of the burdens of public waste, extravagance and mismanagement.

You want a **change**. You want this change at Washington because the present national administration has singled out yours, the biggest of all national industries, as a target for a price fixing policy which has limited the return for your output, while leaving you exposed to the exactions of profiteers in every other line of production, distribution and speculation.

You Have Been the Victim

You have been told what you could charge for your staple products, you have been subjected to all sorts of restraints, exactions and annoyances, while there has been no limit to what others might charge you for food, clothing, machinery and other necessities of your occupation.

The result of this unwise, unsympathetic policy, while harmful to the farm producer, has not been helpful to the consumer. Production has been curtailed, speculation in food has been facilitated, and that expansion of the great farming industry essential to America's future has been halted.

Make the Farm More Profitable

The Republican party by its platform and the utterances of its candidates, is pledged to a sympathetic, practical, helpful attitude toward American agriculture. It promises a constructive program which will make the farm more profitable and therefore more productive.

The Republican party is not a class or sectional party; its policies are intended for the upbuilding of the whole nation. But it believes that it is essential to the general welfare that the American farmer, whose industry is the base of our national prosperity, should be stimulated to larger production

through an assurance to him of a larger share of the values which his own labor and enterprise create.

The Democratic platform reaffirms the tariff-for-revenue-only policy which will open the American market to the invasion of cheap farm products of foreign lands (the resultant of cheap labor) when shipping becomes available. It promises no relief from the price fixing and other farm policies of this administration, or remedy for the violent fluctuations in farm product prices which have caused the farmer such heavy losses.

Pledges of the Party

Here is what the Republican platform and the country-bred candidate say on the issues of special interest to the farmer:

Practical and adequate farm representation in the appointment of governmental officials and commissions.

The right to form co-operative associations for marketing their products, and protection against discrimination.

The scientific study of agricultural prices and farm production costs at home and abroad, with a view to reducing the frequency of abnormal fluctuations, and the uncensored publication of such reports.

The authorization of associations for the extension of personal credit.

A national inquiry on the co-ordination of rail, water and motor transportation, with adequate facilities for receiving, handling and marketing food.

The encouragement of our export trade.

An end to unnecessary price fixing and ill-considered efforts arbitrarily to reduce prices of farm products, which invariably result to the disadvantage both of producer and consumer.

The encouragement of the production and importation of fertilizing material and for its extended use.

The extension of the federal farm loan act so as to help farmers to become farm owners

and thus reduce the evils of farm tenantry, and also to furnish such long-time credit as farmers need to finance adequately their larger and long-time production operations.

Revision of the tariff as necessary for the preservation of a home market for American labor, agriculture and industries. (Note that the pledge to the farmer is just as specific as to labor and capital.)

Harding's Endorsement

Senator Warren G. Harding, the Republican nominee, in his speech of acceptance took advanced ground on behalf of agriculture. He said:

"I hold that farmers should not only be permitted but encouraged to join in co-operative associations to reap the just measure of reward merited by their arduous toil."

"Our platform is an earnest pledge of renewed concern for agriculture, and we pledge effective expression in law and practice. We will hail that co-operation which will make profitable and desirable the ownership and operation of small farms and which will facilitate the marketing of farm products without the lamentable waste which exists under present conditions.

"A Republican administration will be committed to a renewed regard for agriculture and seek the participation of farmers in curing the ills justly complained of and aim to place the American farm where it ought to be—highly ranked in American activities and fully sharing the highest good fortune of American life.

"Becoming associated with this subject are the policies of irrigation and reclamation, so essential to agricultural expansion, and the continued development of the great and wonderful west."

Mr. Harding pledges federal co-operation with state governments in building and improving farms-to-market roads rather than national highways, to cheapen and facilitate the quick shipment of crops.

Send for a free copy of Senator Harding's address in which he discusses at length present day problems of the farmer.

REPUBLICAN NATIONAL COMMITTEE, Auditorium Hotel, Chicago.

WHEN WRITING ADVERTISERS MENTION BETTER FRUIT

BETTER FRUIT

An Illustrated Magazine Devoted to the Interests of Modern Fruit Growing and Marketing.

Published Monthly
by

Better Fruit Publishing Company

703 Oregonian Building
PORTLAND, OREGON

Delayed Apple Buying.

It is now evident that speculation in the 1920 apple crop will be reduced to the minimum as buyers who last year bought large blocks of apples early in the season are holding off until the market is more fully developed. In fact, apple sales up to September 1st have been fewer than in almost any years that men in the trade can remember. This does not necessarily mean a poor year for the grower, but it does mean that the apple movement to the big markets will be considerably slower this year than last and that the grower and shipper must take every precaution to store and care for their holdings. The delay in apple buying is undoubtedly due to some extent to uncertain financial conditions in regard to the movement of almost all farm crops. These conditions will no doubt adjust themselves a little later in the season.

As to the size of the crop, although larger than last year by 15 to 20 per cent, it is not by any means of the bumper proportions of a number of years in the past. There should, therefore, be a good market at satisfactory prices for the crop—particularly the Northwest output, which is far below normal in size, but of fine quality.

Soft Fruit Crop

Generally speaking, the 1920 berry and cherry crop has been marketed at very satisfactory figures to the grower this year. Prices for all kinds of soft fruits have been the highest ever known in the Northwest, and, despite the high cost of labor or materials necessary to the soft fruit industry, growers, almost without exception, have had a most profitable season. In some instances there is a tendency to be skeptical as to whether the establishments who bought the soft fruit crops can turn them at a living profit. Of course this does not worry the grower, except that if prices for the finished product fall down in one year, prices must naturally be lower the next. It is to be assumed, however, that most of the buyers of soft fruits had estimated the quantity they could sell at the prices paid and were taking no chances. In fact in some lines of processed fruits, manufacturers are said to have sold more stock than they could obtain. In others, the prices of fruit were so high that it was almost prohibitive and the output was necessarily limited. In viewing the whole situation canners are inclined to be optimistic in regard to

marketing the season's crop of soft fruits at the increased prices. It is believed, however, that the top notch was reached this year in prices for soft fruit canning stock.

Shipping in Bulk.

The apple packing season is again with us, bringing with it, according to reports from all sections of the country, a distinct shortage of containers. In the East, barrels are high and difficult to get, and in the Northwest the same conditions obtain in regard to boxes. This has led to a great deal of talk about shipping in bulk, and it is probable that a considerable shipment of Northwest apples will be made from some sections in the latter region to points in the Middle West unpacked. These shipments, however, must of necessity be limited as the large Eastern buyers of Northwest apples, buy them on account of the attractiveness of the box package as well as their quality. If they want bulk apples, they can buy them much nearer home. If the box shortage becomes very acute, it may result, in some sections, in the packing of the extra fancy and fancy grades in boxes and in shipping the "C" grade in some other way.

The grower, however, who can obtain boxes should not be tempted to experiment in shipping his apples, even at the high cost of containers. The reputation of the Northwest apple has been built up and is being maintained on its extra high quality pack and a deviation from this course cannot help but prove disastrous.

Marking Fruit Packages.

Fruits and vegetables in package form when shipped into interstate commerce should bear a plain and conspicuous statement of the quantity of the contents in each package, according to a statement made by officials of the Bureau of Chemistry, United States Department of Agriculture, who are charged with the enforcement of the Federal food and drugs act. Instructions have been issued showing how various fruits and vegetables in different styles of packages may be marked in order to comply fully with the net weight amendment to the law, and also showing what shipments of vegetables as ordinarily marketed are exempt from the net weight provisions.

Combating Fire Blight.

Do not forget that fire blight is one of the most serious diseases in an orchard and that when discovered should be cut out at once. This disease shows itself in the fruit spurs and twigs first, which exhibit a cankerous condition. In removing fire blight the cuts should be made 10 to 12 inches below the infected part. The wounds should be disinfected with one grain of cyanide of mercury and one gram of bichloride of mercury to 500cc of water. This com-

bination is an effective disinfectant for both wounds and tools, according to Prof. F. C. Reimer. Frequent inspection in districts where this disease has been discovered is necessary and growers should use extraordinary vigilance in combating this disease.

What the Newspapers Interested in Fruit Are Saying

The removal of price control of apples from August 1 to the middle of November by the British Government reflects the remarks of the embassador at dinner guest that the butter was very good, what there was of it, and that there was enough of it, too, such as it was.—Fruit Trade Journal.

We hear that very extensive orders have been placed for small motor machinery for working citrus farms and sugar plantations in Natal and Transvaal. Elsewhere, there is no doubt that South Africa is certainly behind in its application of motive power to land-working.

A combined tool which ploughs or cultivates, or converts itself into a stationary engine at will and is always ready to work must "stand in" as a thing the working farmer can afford to have. Elsewhere, scarcity and dearth of labor has forced the use of these implements to the front and they certainly cut work. We are not in the dire need of other countries so far as labor goes, but we are in competition with their products, and if they can "do it cheaper" by applying new methods we have got to apply them, too.—South African Fruitgrower.

The California Associated Raisin Company on August 9th named its opening prices for 1920 crop of raisins on a basis of 15c per pound to the grower. This is an increase of five cents per pound over last year's prices. With an increase in the yield this year, raisin growers will receive approximately \$22,000,000 more for this year's crop than they were paid last year.

The estimated tonnage of the 1920 California raisin crop is 200,000,000 tons in comparison with a total tonnage of about 190,000,000 tons produced last year. The price the trade will pay for this year's raisin crop will be approximately \$80,000,000, of which the California raisin growers will receive about \$60,000,000.—Sunset Standard.

The amount of effort it has taken to bring to the attention of people of the valley the menace confronting them in the lack of refrigerator cars for this year is almost unbelievable. When the facts are presented as clearly as they have been in this case it would seem that people would flee to the cause and thereby prevent, if possible, a serious loss. But the general inclination seems to be to let George do it or an implicit confidence that the thing will come out all right. The growth of that idea would ultimately tear down every improvement that has been made with such great effort in the Yakima Valley. It will spell defeat in one corner as surely as the defensive game played by the Germans was disastrous before aggressive forces. Those few individuals who responded to the first call for ammunition in the refrigerator car campaign are in a class with the Belgians who stemmed the gray tide in a critical moment. The present situation demands immediate action of the most aggressive character if the valley is not to feel the pinch of congested transportation when shipping time comes.—Yakima Valley Progress.

How You Can Get Better Fruit's Apple Packing Chart

BETTER FRUIT's apple packing chart as it appears in this number, but printed on cardboard so that it can be hung in the packing house, will be mailed to anyone desiring it on the following terms:

One card FREE with a new subscription to BETTER FRUIT.

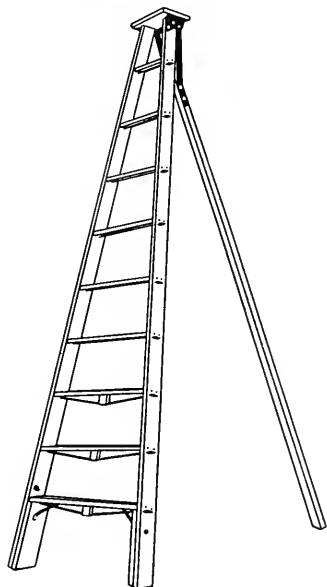
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Twelve cards without subscription...\$1.00

For quantity prices write us.

BETTER FRUIT PUBLISHING CO.

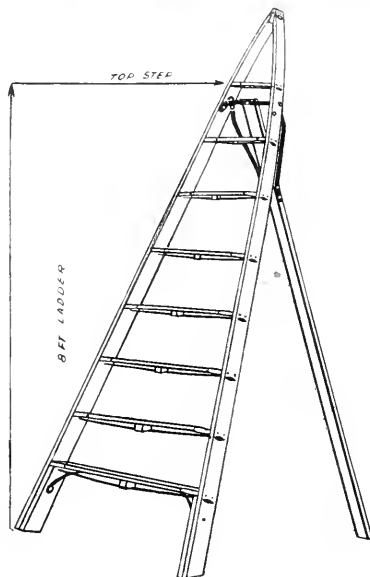
703 Oregonian Building
Portland, Oregon

The Northwest's Orchard Supplies



The Northwest Standard

The ladder chosen by orchardists throughout the United States, because it is light and well constructed.



Eagle Brand Ladder

A handy ladder where limbs are close together; easily put into tree without bruising the limbs.



Bastian Straight Pruner

Why waste your time with an old-style pruner, when you can use the Bastian and prune your trees with ease in one-half the time?

Sold for less money than any other pruner on the market, considering quality and workmanship.



Barnett Picking Pails

No bruised fruit when you use the Canvas Bottom Pail with sides lined. The most modern device for picking fruit. Cost is small.

All Northwest Ladders are made of clear spruce and well ironed, with rod under each step. Ask your dealer for the genuine "Northwest." Our name on each ladder. If he cannot supply you, write us direct.

Sectional Pruner

Bastian Sectional Take-down Pruners, three pruners in one, 6-9-12 feet. A few minutes will change from short to long or to medium. One Sectional will do the work for a fair sized orchard.

Put up in 42-inch length cartons. Can be mailed by parcel post.



Northwest Fence and Wire Works

PORTLAND, OREGON

Service Rendered by Our Fertilizer and Stock Food Factories

By W. R. Lebo, Secretary Marine Products Co., Inc., Tacoma, Washington

The functions of our factories are many. They serve as storage and collection depots for ammoniates, phosphates, potash, guanos and animal and other by-products, brought together from all points of the compass. The materials brought together under a common roof are stored, ground, mixed, screened and handled with specially designed labor saving machinery. Without this treatment many of these ingredients would be a total loss to agriculture.

CHEMICAL CONTROL

The men in charge of our plants are skilled in chemistry and engineering and they must necessarily have a definite knowledge of the chemical reactions that are constantly occurring throughout the entire processing. Ability to judge the chemical combinations in advance so that there are no false notes with resultant failures of manufactured goods is a further requisite. Goods for both fertilizer and stock feed are sampled, analyzed and classed safely. Balanced ration stock feed and formulas are calculated in advance and the combinations resultant must check to a nicety in order to comply with the State fertilizer and feeding laws which require guaranteed analysis.

CONSERVATION

Practical conservation of the highest order is the result of our routine control work and experimentation. The happy combination of technical and practical men in our personnel has saved, and is saving thousands of tons of fish offal in Alaska, packing house offal and other by-products in the Northwest, to be further used in the conservation of the land. One acre well fertilized is often worth two acres unfertilized in actual production. Poultry and live stock when fed a balanced ration combining protein from an animal organic source, phosphates from bone, with a grain ration, show increased production and lower feeding costs.

FIELD WORK

Close observation of the crops grown in California, Oregon and Washington, by trained men who cover every district several times yearly, make it possible for us to carry on the most thorough investigation of fertilizers and their results. Extensive experiments are being carried on in a practical way throughout the Pacific Northwest. The West Side Gardens located near Tacoma, use approximately \$15,000.00 per year of our special formulas on their two hundred odd acre farm, where we have carried on the most exhaustive practical research work ever attempted on the Pacific Coast.

"Puyallup Brand" Berry Fertilizer

"TWO - TEN - TWO"

A concentrated balanced ration berry producing fertilizer, especially designed to meet the needs of berry production in the wet climate of the Pacific Northwest. Constant experiments and close contact with the growers have made "Puyallup Brand" berry fertilizer possible. The theory of this fertilizer is, that it is based on largely organic materials, which



FERTILIZED WITH CHICKEN MANURE

The upper view shows raspberries fertilized with chicken manure. No "Puyallup Brand" fertilizer used. The owner, Mr. Stevenson, at Puyallup, will fertilize with "Puyallup Brand" this year. This place adjoins the one shown below.

are timed to break down as the result of bacterial activity, exerting a continuity of fertilizer effect on the berry vines. The action of organic fertilizers in the soil is ideal from the standpoint of utility. Applying "Puyallup Brand" berry fertilizer will obtain for the grower, first an increase of organic matter content with its effect on water retaining capacity, improved mechanical condition, addition of bacteria, and increased bacterial activity. The bacteria attack particles of meat, blood and bone, thus transforming the nitrogen to ammonia, in which form nitrates are taken up by the roots, the form in which most of the nitrogen is absorbed.

In cold weather the bacteria are not active and at such time as the plant is not actively feeding, the plant food from organic material is not available and for this reason does not leach out of the soil. On the other hand inorganic materials, such as nitrate of soda, are soluble in any kind of weather and readily leach beyond the roots of the tree, often times leaving behind an injurious residue harmful to the plant. By using a natural product, something once a part of a living organism, are allowing nature's forces to take care of the fertilizing in a natural way, you need never worry about what day you must fertilize in get the best results.

The New Growth Bears the Fruit

On blackberries and raspberries the suckers represent the new wood necessary for fruit production. They are essential, but if too many are produced they shade the fruit and make harvesting difficult. Here again new wood growth must be controlled. The runners represent the new wood of strawberries. Those produced by this year's mother plants are used to bear the crop of next year. Here the fertility problem consists in getting a sufficient number of well rooted runners, but avoiding such an excessive number as to make them crowd each other and function as so many weeds.

PLANT FOOD CONTROLS WOOD GROWTH

The kind, form and amount of plant food available for the use of the plant control the wood growth.

Fertilizer Is A Chain

The three links may be termed Nitrogen, Phosphoric Acid and Potash. The limiting factor in the growth of a crop may be one element, any of the three. The plant food ration is no stronger than its weakest link.

NITROGEN is the stem and leaf producer. It produces the green, rank growth of the plant and gives to foliage a healthy green color.

PHOSPHORIC ACID hastens the maturity and increases production of fruit.

POTASH strengthens the fiber of the wood growth and aids in producing healthy disease resistant plants and fruit, and above all produces hard shipping quality in the berry.

Note:—Where the grower is getting sufficient cane growth and wishes to increase shipping quality, we substitute a two-ten-four analysis, increasing the formula by 2 per cent. of potash to cover this condition.

PLANT FOOD MUST BE BALANCED

Sickly and weakened condition of growth indicates lack of nitrogen. But nitrogen unbalanced by the other food usually proves a very poor remedy. If the plant food ration is out of balance, new wood delays in ripening, is subject to winter killing, and the excessive growth of leaves shades the fruit and leads to poor quality. Phosphoric acid and potash, in combination with nitrogen, remedies this condition. The best fertility practice is to use "Puyallup Brand" berry fertilizer which grows enough new wood for a full set of fruit, but which also helps to strengthen it, to prevent winter killing.

CLOVER IN THE BERRY FIELD

Cane berries will eventually be planted seven to eight feet apart in the rows and a legume grown through the center. This will be disked in to allow of ready access between the rows. The actual cane row may be clean cultivated. In this manner much of the nitrogen required can be secured by the legume which will also furnish organic matter and a special phosphoric acid and potash fertilizer



FERTILIZED WITH "PUYALLUP BRAND"

G. Hannalish place adjoins the berry patch in upper picture. Our Major Newsum is over six feet tall and his position illustrates the splendid growth received as a result of "Puyallup Brand" berry fertilizer which was applied in the fall.

may be obtained from the manufacturer of fertilizers to supply the fruit's demands.

DIRECTIONS

Small fruit require from 1000 lbs. to 2000 lbs. of "Puyallup Brand" fertilizer applied to each acre yearly, in order to produce heavy yield crops, year after year.

METHOD OF APPLICATION

The best method is to make two applications; one-half in the Fall and one-half in the Spring. Good results have been shown by fertilizing in a circle around the upper root system, starting 8 inches or 10 inches from the stalk of the vine. Where proper cultivation is carried on, broadcasting between the rows places the plant food where it is ultimately available. There is no danger to working "Puyallup Brand" fertilizer around the roots of berry fruits.

SPRING FERTILIZATION

At this season of the year there is a current of life that pulsates throughout the whole animal and vegetable Kingdoms. "Spring's Impulse" it is sometimes called, and who can deny its influence? Do not wait to respond to the call of your fruit vines until the buds are bursting and the new leaves are evidence that "Spring has come." This period is too late for the best results for fertilizer as the strongest impulse is past. Later efforts of fertilization are never as efficacious.

The soil is nature's factory and must limit its output to the raw material on hand. If the plant food is not ready when needed you've lost part of the growth which your berry vines would have made. A successful farmer should look ahead as the successful manufacturer does and provide for the conditions which are going to exist. A supply of organic plant food should be at the demand of the seething new rootlets which put forth in every direction. "Puyallup Brand" supplies the demand for material to produce growth of foliage and new wood, as well as the much desired heavy bloom.

SUMMER FERTILIZER

Summer fertilizing is often resorted to, to provide a sustaining food to develop growth properly and to hold and mature the young fruit. Laying the foundation for the next year's crop depends as surely upon sufficient food as its quality depends upon the source of its food. At this period we supply special mixtures low in nitrogen and high in potash to give firmness and shipping qualities to the berry. This treatment adds materially to weight and solidity.

FALL FERTILIZING

Berry trees and vines in the main should be fertilized in the Fall. Our "Puyallup Brand" berry fertilizer is manufactured from slowly available organic materials for this season. The fertility elements contained in this application are gradually taken up and assimilated by the roots during the late Fall and Winter, thus establishing full vigor. This Fall storage of plant food assists in avoiding loss by frost because of the increased vigor and ability to withstand its inroads. Capacity of strawberry and berry vines means chiefly bearing surface, other conditions being normal. Applications of "Puyallup Brand" fertilizer in the Fall have proven that big capacity bearing surface is the result.

Anthraxnose on Berries.

To prevent anthraxnose in loganberries or blackberries remove all the old canes as soon as the harvest is complete and burn them. This is a safer plan than cutting the canes up and plowing them under. Next spring spray the plants just before the blossoms open and again two weeks after the blossoming period, using Bordeaux mixture 2-3-50.

Early Picked Pears.

Early picked pears are decidedly inferior in quality to those harvested later, says the O. A. C. Experiment Station. Pears picked from the middle to the end of the season likewise keep slightly longer in cold storage than the early picked fruit. Growers can get the pear harvesting and storage bulletin by writing to the college at Corvallis.

Warning

The success of Marine Products Company's "Puyallup Brand" berry fertilizer has caused several companies to duplicate the chemical analysis, two-ten-two, and their salesmen make the statement "as good as Marine Products Company's berry fertilizer and costs you less money."

Remember there are two points of view in fertilizing:

1st. To start the vine.

2nd. To nourish it to fruition.

Our fertilizer represents a continuity of plant food energy; the organic materials are combined to break down during the entire growing and fruition period, and the constituent elements knit with the soil in a natural way. By substituting chemicals and organic materials not readily available, our superior facilities and greater buying and distributing power, would allow us to make a cut price fertilizer cheaper than any produced in the Northwest.

CHEMICAL ANALYSIS

We guarantee analysis but a stress should be laid not upon analysis and notations so much as upon the *intrinsic and agricultural* values. Bear in mind that a manufacturer looking more to profits than to their reputation, may use materials which possess high chemical valuations at a low expense, yet in so doing they may rob the fertilizer of its *agricultural value* simply to obtain a *commercial value*. When an Agriculturalist says one analysis is as good as another, remember he speaks only from the more or less limited experience which he may have gained in a community where some Agricultural Experiment Stations still recommend playing with the crop, feeding it first one thing and then another. The crop

Commercial Manures

	Phos.			
	Nit.	A.	Potash	
Berries....	2	10	2	"Puyallup" Brand
Large Fruit	6	10	4	"Clarke's" Wenatchee Orchard Dressing
	1	8	10	"Harris" Special (Hood River)
Potatoes...	2	10	4	"Potato" Special
Tomatoes...	3	8	6	"Tomato" Special
Vegetables...	2	10	2	"Lebo's" General
Hops.....	6	8	4	(Muehler's Hop)
Lawns				Tankage, Fish Meads
Miscellaneous				Marpoco Brands
Sea Products				Fish Meal, Whale Meal, Kelp Potash, Whale Bone

Potash, Nitrate, Blood, Bone,
Superphosphate

TANKAGE

Carlot Shippers Aquatic and Packing House
By-products for Feed and Fertilizer

Marine Products Company
TACOMA, U. S. A.

requires a complete balanced ration plant food just as live stock requires such a ration. Our fertilizers are built on the basis of natural crop requirements.

"PROOF OF THE PUDDING"

The "proof of the pudding is in the eating thereof." Our efforts are rewarded by the hundreds of testimonials, some of them contained herein.

Salem, Oregon, July 28, 1920.

Marine Products Co.
I used your fertilizer this Spring on one acre of loganberries and am securing great results; in fact, far better than anticipated. Am getting three times as many berries as my neighbor adjoining. Am well pleased with the fertilizer.
John D. Camphell.

Salem, Oregon, July 27, 1920.

I used Marine Products Co.'s "Puyallup Brand" fertilizer on loganberries this year and have got an excellent cane growth from its use. Also an increased production of berries.
R. M. Cammack.

Hubbard, Oregon, July 28, 1920.

I used Marine Products Co.'s "Puyallup Brand" fertilizer on six rows of my loganberries. These rows were on my poorest ground, but I obtained twice the yield on these rows than I did on the unfertilized rows. I am well pleased with the fertilizer.
H. W. Kunkle.

Route 1, Box 2, Puyallup, July 27, 1920.

This is to say that the past Spring I used the Marine Products Co. berry fertilizer on my raspberry patch. I am exceedingly well pleased with the results. The cane growth is fine, the berries are large and firm, and there is every indication of a fine crop. The patch was in a very run down condition when I applied the fertilizer.
Chas. Nolin.

Route 3, Box 172, Puyallup, Wash.

I have used the Marine Products Co. berry fertilizer on strawberries, blackberries and raspberries. The strawberries gave a 200 per cent. increase in yield. The blackberries have not yet come into bearing, but I have never seen finer cane growth and the blooms are profuse. They will yield a bumper crop. There is fully a 50 per cent. increase in the cane growth of the raspberries and while the yield has been cut down by the frost, nevertheless the good effects of the fertilizer can be clearly seen.
R. M. Camphell.

Route 3, Box 180, 21st St. N.W.,

Puyallup, July 19, 1920.
I think I have the finest berry patch in the Valley. The yield in berries of fine quality has been so heavy that I had to use the double wire system as trellis support. The new cane growth reaches up from ten to twelve feet. I think that to say there has been a sixty per cent. new cane growth above the old vines would be a conservative statement.

I used the Pu-L-Up berry fertilizer on my raspberries and reinforced the same with a small amount of chicken litter from the chicken house, composed mostly of straw. I also used the fertilizer on my rhubarb, with the result that the canning company paid me one cent more per pound on account of the extra quality.

I feel that the Marine Products Co. fertilizer, together with good tillage, has accomplished astonishing results. We have named our ranch "The Lucky Ten."
Mrs. Genevieve Ferguson.

The Value of An Apple

depends greatly on its appearance. When Nature has done her part, giving size, color and shape to your fruit, do not lessen your profit by use of imperfect picking devices, which may bruise or mar the fruit's appearance, when you can buy

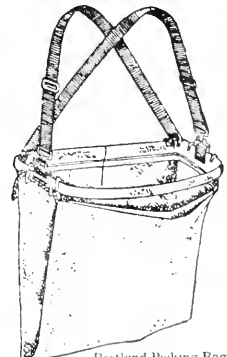
A Portland Picking Bag

Designed to afford safety to your fruit from tree to box.

Price, \$2.50 Each

THE HARDIE MFG. CO.

55 No. Front St., Portland, Ore. 222 Los Angeles St., Los Angeles, Cal.



Portland Picking Bag

Fairs—Their Value to the Community

COMMUNITY, county, state and interstate fairs are a big asset to both the business man and producer.

It follows that promoting some form of community fair, such as an exhibit of local products, is profitable from many points of view. It stimulates better production of stock, farm produce and garden truck. It engenders the community pride, and advertises in an attractive fashion good products and those who produced them.

Advertisers have discovered that good characteristics of their products which are so familiar to them as to seem commonplace are often not so well known to the great buying public. Goods must be talked about if business is to be secured. The same holds true with communities. The excellence of neighborhood products and the special lines in which various individuals excel may seem like a very old story to those immediately concerned, but there are plenty of folks near by who have not heard this story, or, by chance they have heard it, it is very much worth while from a business standpoint to repeat it—and more than once.

If the community decides to hold a fair, an organization should be formed, officers elected, and committees appointed. The latter should include committees on amusement and

entertainments, arrangements, decorations and publicity. These are general committees. In addition, there should be exhibit department committees for such exhibits as live stock, farm products, orchard and garden products, women's work and fine arts, school and club exhibits and historical relics.

Too much emphasis cannot be placed on properly advertising the fair through articles in the local papers, printed handbills, hand-made posters, notices read, preferably several times, in the schools and churches, and in various other ways. The publicity committee should give special attention to advertising in neighboring communities, extending an invitation in such cordial terms that many who do not ordinarily visit the community holding the exhibit will be induced to do so.

The exhibit should represent as nearly as possible the normal production of the community, for one of the purposes of such a fair is to stimulate interest in increasing the quantity and improving the quality of the average produce, as well as giving special recognition to the leaders in different lines. Freak exhibits are to be avoided. The committee should make it a point to solicit exhibits from all persons eligible, not failing to emphasize the business benefits which may result.

"Redimade" Portable Take-Apart House For Apple Pickers' Use



Price F. O. B. Portland **\$155.00**

Can be erected by two men in a day. Can be easily taken apart and stored away. Made in 4 ft. wide sections ready to bolt together. Best grade material, size 10x16 feet. Prices include matched sectional floor, three single sash windows and door, and prepared roofing, everything ready to put together and move in. Siding is best 1x6 rustic. Order as many houses as you need for your pickers.

Redimade Building Co.

801 Lewis Bldg., PORTLAND, OREGON

No Orchard or Farm is Complete
Without Our Latest Model

**COMMERCIAL SIZE
All Purpose Evaporator**

Write for Folder

HOME EVAPORATOR CO.
ST. LOUIS, MISSOURI

P. O. Box 817

Central Station

Success Ewing Orchard Ladder

Scientific tests and calculations must enter into the design and construction of a perfect Orchard Ladder.

The weight and breaking strength of lumber, as well as its ability to stand exposure without checking and splitting, determines the kind of material to be used.

The constantly varying leverages and loads to which the ladder is subjected determines the design which should be used.

A ladder designed so as to combine maximum strength with minimum weight and long life is what has been produced in the SUCCESS LADDER.

It differs from other ladders in the following points:—

"A"—Lighter weight.

"B"—Greater strength.

"C"—Clear dry spruce lumber—the strongest wood for its weight that grows.

"D"—Special patented metal clips to hold steps, which are also fully rounded throughout.

"E"—For shipping or being stored can be completely folded into one-half the space occupied by other ladders.

"F"—No long, weak lower steps as in other ladders.

8 ft. ladder, 27 lbs. 10 ft. ladder, 31 lbs. 12 ft. ladder, 40 lbs.

14 ft. ladder, 44 lbs. 16 ft. ladder, 53 lbs.

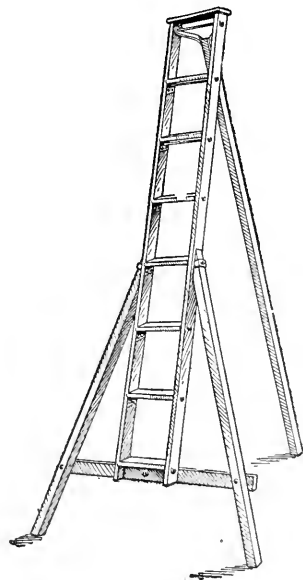
No Wobble—Always Steady

Manufactured by

SUCCESS SEED GRADER CO., Inc.
SPOKANE, WASHINGTON

**DEALERS
WANTED**

**SEND FOR
LITERATURE
TODAY**



United States Export Trade in Apples

(Prepared by the Division of Statistics, Bureau of Foreign and Domestic Commerce)

THE calendar year 1919 shows the most remarkable values in the history of the United States export trade in apples. These exports consisted of 24,704,359 pounds of dried apples, invoiced at \$4,109,828, and 1,712,367 barrels of ripe or green apples, worth \$14,471,282, or an aggregate value of \$18,581,110. This is an increase of 45 per cent in the total value, but a decrease of 36 per cent in the quantity of dried apples and 11 per cent in the quantity of fresh apples exported, as compared with the pre-war calendar year 1913, when the exports were 38,734,465 pounds of dried apples, invoiced at \$2,719,203, and 1,920,221 barrels of green or ripe apples, worth \$7,417,400, or an aggregate value of \$10,136,603.

The extraordinary fluctuations in the value and volume of this trade for the calendar years 1913-1919 may be noted in the table of exports and the average annual prices given below:

Year	Dried			Green or Ripe		
	Pounds	Value	Average price per pound	Barrels	Value	Average price per barrel
1913	38,734,465	\$2,719,203	\$0.070	1,920,221	\$7,417,400	\$3.80
1914	31,027,551	2,441,094	.078	1,511,361	5,695,621	3.70
1915	33,908,508	2,671,601	.078	2,176,992	7,686,992	3.53
1916	13,186,467	1,002,007	.076	1,670,543	7,205,766	4.31
1917	7,852,773	691,111	.088	958,101	4,490,707	4.69
1918	2,200,483	311,350	.141	579,916	3,135,203	5.40
1919	24,704,359	4,109,828	.166	1,712,367	14,471,282	8.45

The foregoing figures would seem to indicate that the ordinary laws of supply and demand as affecting values were inoperative during the war period and the peace year 1919. In the normal pre-war year 1913 the average annual export price of dried apples was \$0.07 per pound, and of fresh apples \$3.80 per barrel. The outbreak of the war cut off to a large extent the usual competition in European markets from the other great apple-growing countries—Australia, New Zealand, and Canada. As compared with 1913, there was a decrease in American exports of dried apples of 7,706,914 pounds in 1914 and 4,825,957 pounds in 1915, without a proportionate rise in value, the average annual export price for those years remaining \$0.078 per pound. The same paradoxical situation occurred in 1916, when the exports were 20,722,041 pounds less than in the previous year and the average annual export price dropped from \$0.078 to \$0.076. Likewise, exports of fresh apples declined 378,860 barrels in 1914, as compared with 1913, and the average price also declined from \$3.80 in 1913 to \$3.70 in 1914.

From 1916 decreasing exportation of both dried and fresh apples was a factor in the ascending scale of average annual export prices, which amount to \$5.40 per barrel for fresh and \$0.141 per pound for drier or evaporated apples in 1918, the last year of the war, and achieved the

high record of \$8.45 per barrel for fresh and \$0.166 per pound for dried apples in the peace year 1919.

The variations in the quantity, value, and average price in the export trade from month to month during 1919 are shown in the following table:

Months	Dried			Green or Ripe		
	Pounds	Value	Average price per pound	Barrels	Value	Average price per barrel
January	2,306,575	\$ 346,331	\$0.150	213,107	\$1,527,498	\$7.17
February	1,208,392	182,193	.150	493,996	3,792,361	7.68
March	2,838,155	428,737	.151	286,970	2,619,902	9.13
April	7,623,921	1,073,391	.141	137,409	1,455,211	10.60
May	1,178,257	219,095	.160	20,747	280,747	13.36
June	2,809,427	532,470	.190	8,610	101,733	11.30
July	1,562,188	289,855	.192	23,450	170,164	7.25
August	438,025	72,887	.166	21,659	162,860	7.55
September	561,773	121,405	.216	34,619	238,780	6.90
October	277,648	55,689	.200	115,715	1,038,251	8.97
November	1,815,234	343,561	.188	213,270	1,739,297	8.15
December	2,084,761	431,214	.208	112,806	1,344,478	9.40
Total	24,704,359	\$4,109,828	\$0.166	1,712,367	\$14,471,282	\$8.45

Unusually heavy exports of dried apples, running in millions of pounds, were made during each month of last year, except the principal harvest

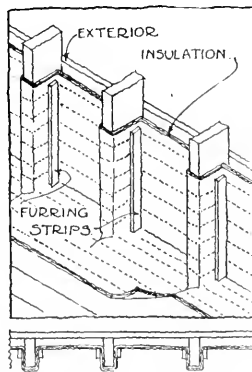
monthly export price for the year, the highest, \$0.216 per pound, occurring in September, when the exports dropped to 561,773 pounds, valued at \$121,405.

The movement of green or ripe apples to foreign markets was heaviest during the first and last quarters of 1919. With regard to quantity and total value, the February exports of 493,996 barrels, invoiced at \$3,792,361,

or an average of \$7.68 a barrel, surpass those of any other month. May, however, records the highest monthly average export price on apples, reaching \$13.36 per barrel. September exports of 34,619 barrel, invoiced at \$238,780, disclose the lowest average monthly export price of fresh apples, \$6.90 per barrel, as well as the high record export price on the evaporated fruit. Diminishing stocks of fresh apples in cold storage naturally curtailed exportation for the six months, May to September.

The combined fruit crops of the United States perhaps exceed in variety, quantity, and value those of any other nation. The most important of these in the export trade is the apple. This country is one of the greatest fruit-consuming as well as

Don't Let Your Apples Freeze!



LINE YOUR PACKING HOUSES
—WITH—

Roberts Stitched Padded Insulating Material

It is made of two layers of extra heavy building paper with a thick filling of flax tow, stitched like a quilt, and comes in rolls 36 inches wide. Easy to apply, just nail it on with furring strips, and it will form a thorough protection from freezing.

It Keeps Out the Cold and Frost

Shipped in rolls containing 250 square feet.
Weight 45 pounds.

Special Price per roll **\$4.65**
Freight prepaid

P. L. CHERRY CO., Building Materials
271 Hawthorne Avenue, Portland, Oregon

fruit-producing nations on the globe, yet, in addition to the domestic consumption, \$122,678,783 worth of all kinds of fruit were exported during the calendar year 1919, of which 15 per cent, or \$18,581,110, was for dried and fresh apples, not including large quantities of canned and preserved apple products also exported. The distribution of these exports by principal countries during November and December, and for the calendar year 1919, was as follows:

total green and ripe apples exported, value at \$6,089,701, the United Kingdom took \$3,112,956 worth, Canada \$1,040,413, Germany \$916,883, Australia \$200,847, Argentina \$156,839, and Brazil \$124,520 worth, smaller amounts being shown for other countries.

War did not seriously interfere with the exportation of fresh apples from the United States to Great Britain, but rather stimulated the demand for the American product. During the

States, Canada 14.3 per cent, Germany 10.1 per cent, and all other countries 9.8 per cent.

As the Australian apples are marketed from May to August and the English crop from September to November, American exports are naturally largest from November to May, when the new crop is available at the most opportune time for marketing it in European countries. From the pre-war calendar year 1913 figure of \$3.80 per barrel for fresh apples to \$8.45 in 1919 an increase of 122 per cent is shown in the average annual export price.

Fruit Growers Start Box Factory

Unable to obtain sufficient boxes in the Yakima and Wenatchee districts, a number of fruitgrowers there have engaged in the manufacture of boxes in Portland, Oregon. The plant of the new concern, which is known as the Bede Box & Lumber Company, is located on the Columbia river in North Portland. The new plant which has just been started is now turning out 20,000 boxes a day, and next year the owners expect to greatly increase the output. Although delayed in starting by the failure of machinery to arrive, the plant will turn out this year 600,000 boxes, which will be shipped to the Yakima and Wenatchee districts.

A feature of the plant is that it is manufacturing the boxes direct from the logs—a process that is said to be from 15 to 20 per cent, cheaper than the usual one of utilizing lumber. Equipped with electric power and the most modern box making machinery, the cost of manufacture is reduced to a minimum. The plant is 50x150 feet, and has a frontage on the river of 700 feet. Next year dry kilns will be built and other improvements made.

The men directly connected with the management of the enterprise are D. R. Loughlin, M. Harkema and D. H. Armstrong.

APPLE BOXES

Highest Quality Western Yellow Pine

If you wish to make sure of a supply of well made boxes at fair prices, let us place your orders.

Carloads Only

SPOKANE FRUIT GROWERS CO.
Spokane, Washington

Nice Bright Western Pine

FRUIT BOXES AND CRATES

Good standard grades. Well made. Quick shipments. Carloads or less. Get our prices.

Western Pine Box Sales Co.
SPOKANE, WASH.

NOW is the time to send to

Milton Nursery Company
MILTON, OREGON

FOR THEIR 1919 CATALOG
FULL LINE OF NURSERY STOCK.

"Genuineness and Quality"

Countries	Year ended December		December		November	
	Quantity	Value	Quantity	Value	Quantity	Value
Dried Apples	Pounds		Pounds		Pounds	
Belgium	50,000	\$11,600	523,396	\$112,276	2,013,180	\$366,059
Denmark	321,012	62,921	298,100	76,350	3,512,038	657,108
Finland	5,000	1,075	90,050	19,010	893,762	183,998
France	30,200	1,853	7,250	1,812	1,625,139	191,820
Netherlands	50,286	8,123	178,196	94,089	490,503	93,068
Norway	1,279,568	238,225	506,573	89,363	2,283,759	400,006
Sweden	13,572	2,313	57,012	13,752	7,309,782	1,296,930
United Kingdom	62,596	15,021	123,851	27,541	5,718,424	755,048
All other					827,472	165,791
Total	1,815,231	343,561	2,081,761	434,214	24,704,359	4,109,828
Green or Ripe Apples	Barrels		Barrels		Barrels	
Denmark	1,657	15,653	1,167	11,618	33,281	393,818
Norway	2,292	21,368	21,575	230,683	117,586	1,097,113
Sweden	349	3,625	—	—	34,950	457,119
United Kingdom	114,638	1,220,362	83,548	815,033	1,209,855	9,557,126
Canada	37,218	236,423	15,166	98,379	158,859	1,131,728
Mexico	4,360	33,417	3,915	35,251	23,565	193,541
Cuba	6,568	61,805	9,671	85,577	296,548	245,726
Argentina	2,510	33,250	—	—	15,159	207,822
Brazil	1,633	20,233	157	2,005	16,880	206,536
Philippine Islands	4,890	30,980	2,742	22,836	15,682	105,383
All other	7,435	61,521	4,835	43,066	30,002	285,310
Total	213,270	1,739,297	142,806	1,344,478	1,712,367	14,471,282

Since the colonial period the United Kingdom has offered the principal foreign market for fresh American apples, to which has been added in more recent times other British dominions, particularly Canada and Australia. Prior to the war Germany also bought liberally of the fresh fruit. In the fiscal year 1914, of the

fiscal years, 1914 to 1918, the United Kingdom took 60 per cent of the quantity and 59 per cent of the value of the total exports of fresh apples from this country. During the fiscal years 1910 to 1914 the United Kingdom took an average of 65.8 per cent of the total quantity of fresh apples exported from the United

The Package for Apples



Universal Package

Pack right in the field. Saves time! Ship direct to market without repacking. Covers fastened tightly without nails. No injury to fruit when inspected. This strong package prevents crushing of apples. Apples bring higher prices when displayed in this clean attractive package.

Write for prices TODAY

PACKAGE SALES CORPORATION

106 East Jefferson Street, SOUTH BEND, INDIANA



Apple Crop Estimated at 175,000 Cars

THE Denver & Rio Grande Railroad Company has recently issued a report on the estimated volume of this year's commercial apple crop in the United States and Canada. The report is based upon data secured from personal night letter reports received from members of the American Railway Development Association living in commercial apple districts of the United States and also state board of agriculture statisticians, the fruit commissioner of Canada and Canadian Pacific Railroad.

The total estimated shipment of commercial apples for North America for this season is 175,500 carloads.

Barrels are scarce and are costing growers from \$1.25 to \$1.50; boxes are costing growers from 27 to 32c. It is predicted a large volume of apples will move in bulk.

The average all-around condition or quality is 70 per cent against a ten-year average of 61 per cent.

The final estimate of the apple crop in the United States for 1919 was about 130,000 cars.

District	% of Crop 1919	% of Crop 1920	Estimated Volume of 1920 Crop in Cars	Container Used
1. New York	31	86	20,000	Bbl.
2. Penn.	10	80	2,150	Bbl.
3. Md., Va. and W. Va.	43	62	22,000	Bbl.
4. S. E. Group (Tenn., Ga., Ala., N. C.)	25	68	3,750	Bbl. & Box
5. Michigan	42	82	11,730	Bbl.
6. Ohio and Ind.	20	65	7,000	Bbl. & Bk. Bskt.
7. Illinois	26	65	9,000	Bbl.
8. Ozarks (Mo. and Ark.)	72	47	5,230	Bbl.
9. Colo. and Utah	58	79	4,500	Box
10. N. W. District (Mont., Ida., Wash. and Oregon)	81	71	25,000	Box
11. Canada	90	70	12,600	Bbl. & Box

Transplanting Deciduous Fruit Trees

By J. C. Whitten, Professor of Pomology, University of California

THE growth and development made by a deciduous fruit tree the first years it is in the orchard is perhaps more important in determining its productivity and efficiency than is any other year in its life history. In handling the tree every possible precaution should be taken to avoid drying the roots by unnecessary exposure to the air; the roots should not be bent or kinked in planting; dead, fibrous rootlets should be pruned away; the roots should not be exposed to freezing temperatures; usually the tree should be set no deeper than it stood in the nursery (most fruit trees are set too deep); the soil should be pressed firmly about the roots; the roots should not be bruised in handling; roots and tops should be properly pruned at the time of planting; the tree should be white-washed as soon as possible after planting in winter. Most of these suggestions are well understood by the experienced fruit grower; most of them are well neglected by the average operator who plants the tree. If most of our transplanted fruit trees live we are apt to think they were properly handled. As a matter of fact fruit trees are tenacious of life. They may endure lots of abuse and still live, but abuse weakens them. In my judgment more than half the fruit trees planted yearly in the United States make less than half the growth they should make the first year in the orchard. These observations should not be regarded as a reflection upon the fruit grower, for it is the successful fruit grower with whom I have been intimately associated, who first called these suggestions to my attention. Some of them have been still farther emphasized by investigations which these fruit growers stimulated.

Before planting the trees the soil should be plowed to a good depth and as carefully pulverized as is required

for a seed bed. If there is a hard plow-sole beneath, the plow should be followed by a subsoiler. If the land is crusty or cloddy on top, it should be disked to pulverize the surface before plowing. This avoids turning under large clods, which can not be pulverized by the disk or harrow after the plowing is done. Such clods turned under leave air spaces which will dry out. If the subsoil is reasonably porous, the use of dynamite will not be necessary. If there is a shell of impervious hardpan a few feet below the surface it is advisable to explode a stick or half stick of dynamite below each tree hole to crack through the hardpan shell to porous subsoil below. If hard subsoil is too deep to crack through to a porous layer beneath, the value of dynamite is doubtful. It may form an undrained water pocket below the tree. Dynamite should be used only when the subsoil is dry and brittle, so it will be shattered by the blast. Dynamiting wet wet subsoil puddles it.

If the soil has been thoroughly worked throughout the orchard, the holes should be dug only deep enough and wide enough to accommodate the natural spread of the roots of the trees. If the holes are dug deep the soil and young trees may settle after planting, leaving the tree set too deep. If, however, replants are being set in an established orchard the holes should be dug deep and broad enough to cut back the roots of surrounding trees, so they can not compete with the roots of the replant. Often the roots of three or four year old trees may spread to the openings where replants have died out.

Every reasonable precaution should be taken to avoid exposure of the roots of the trees to the air in handling. The tops of trees are adapted to exposure to dry air; the roots are not. Even under favorable conditions the roots of trees

are necessarily exposed more than is good for them, between digging in the nursery and setting in the orchard. When received from the nursery, trees should be "heeled" in a trench, getting moist soil pressed firmly in contact with the roots as soon as possible. In handling trees to "heel" them in or to plant them in the orchard the roots should be dipped in a thin "puddle" of soil and water to hold a moist layer on the roots and avoid drying. Careful experiments covering several seasons show that any exposure of the roots to drying out weakens them, and that the more they are exposed between digging and planting the less growth they make, the larger percentage that will die the first season and the more susceptible they become to sunscald, borers and many other troubles.

It is a fact not heretofore generally known that the roots of fruit trees are easily injured by slight freezing. The roots are adapted to soil temperatures which rarely fall more than a few degrees below freezing, even in northern climates. Careful investigations show that the roots of our hardiest fruit trees, such as the northern native plum, are usually killed at a temperature of twenty-two degrees, or ten degrees below freezing. The roots of peaches,

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Boys and Girls

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And for those who would like to start in the Poultry business, I will start them by supplying pure-bred Chickens Free.

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Please tell me how I can secure.....
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apricots and the more tender fruits usually "kill" at five or six degrees of frost. The wood within the roots quickly turns brown at such temperatures, while the wood of the stems and branches may endure temperatures far below zero without injury. Such trees may look all right when planted, but may fail to grow and finally shrivel in the orchard because the roots were dead. The roots may be badly injured even by two or three degrees of frost. It is safer not to expose the roots to the air whenever the temperature is as low as thirty-two degrees Fahr.

The tree should be set so as to retain the natural spread of the roots. A main root should not be crooked in setting. Bending a root restricts the passage of water through the water tubes in the wood. It is almost impossible to firm the soil around a very long root without leaving kinks in it. It is safer to cut long roots to six or eight inches in length, so they will not be bent in tamping the soil about them.

In handling nursery trees most of the small, fibrous roots die before the tree is finally set in the orchard. If left on the roots they are not only use-

less but are injurious to the tree. These dead, curling fibres prevent getting the soil in close, firm contact with the larger main roots, which are alive and which must be depended upon to supply the top with water from the soil until new fibrous roots form. The small, dead fibres should be pruned away, cutting them within about one-fourth or one-half inch of the main root—usually the basal stubs of these small roots remain alive. Their cut ends increase greatly the absorbing surface of the roots, until new root growth begins.

Usually the tree should be planted no deeper than it stood in the nursery. The young tree forms its roots in the nursery at that depth which is most congenial to their development. New root growth starts more promptly where the soil warms first near the surface. Deep set roots often do not start new growth until the trees are out in leaf and thus calling for much water to supply that which is evaporated from the leaves. Most planters set trees too deep. The earlier roots start growth after planting, the deeper they will grow during the season and the more satisfactory will be the growth of the tree above ground. In transplanting trees from a nursery having a heavy, cool soil, to an orchard with loose, sandy, well aired soil, which warms and dries quickly to a good depth, the roots may be set correspondingly deeper.

This point can hardly be over-emphasized. To get the soil firm it should be tramped firmly with the heels from the bottom of the hole up. If as much as six inches of soil is filled into the hole without tramping it can not be made firm about the roots. To get water enough the roots must come in close contact with thoroughly compacted soil in which there are no large pockets.

Press between roots rather than against them. Bruised roots can not make proper growth and are susceptible to crown-gall, oak fungus, root insects or diseases that may enter through wounds.

Shorten this whip to twenty-four or thirty inches in height. This gives opportunity to space the new limbs six or eight inches apart, where they arise from the trunk, when they start in spring. About three main limbs should be arise from the trunk the first year. The intervening shoots should be pinched back to three or four leaves each. This will encourage full development of the main branches where they are desired. The short intervening, leafy twigs, shade the trunk and elaborate plant food to favor greater growth of the tree. If the tree is well branched at the time of planting, three or four strong nursery limbs may be allowed to remain, properly shortened, to become the first framework of the tree.

The whitewash reflects the heat on sunny days and prevents sunscald, which begins while the tree is dormant. Whitewashed trees do not burn or dry out, their buds remain fresh and vigorous and they will make stronger growth.

"In Every Respect"

says the Good Judge



You get more genuine chewing satisfaction from the Real Tobacco Chew than you ever got from the ordinary kind.

The good tobacco taste lasts so long—a small chew of this class of tobacco lasts much longer than a big chew of the old kind. That's why it costs less to use.

Any man who has used both kinds will tell you that.

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After the Crops Are Harvested
Comes Painting Time

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*lengthens the life of your home,
buildings and machinery*

Fall is a good time for painting. Don't put it off another season if there's anything on the farm that needs paint.

Exposed surfaces mean swift decay, decreased values on your property, loss of money.

Get busy with the paint brush and FULLER paint while the weather permits. Remember that it's not what it costs to paint, it's what it costs not to paint.



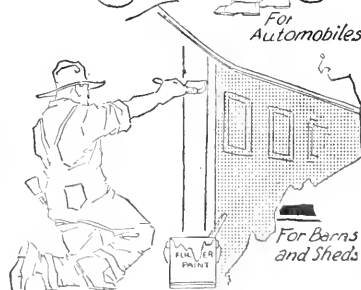
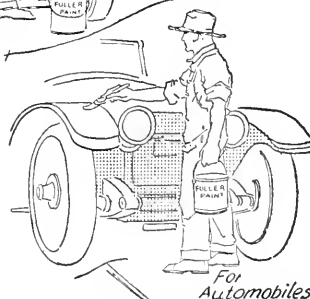
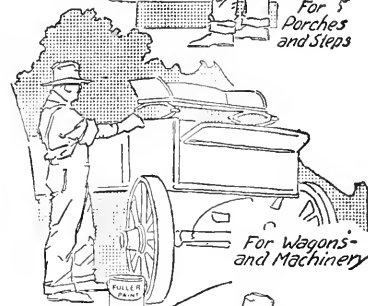
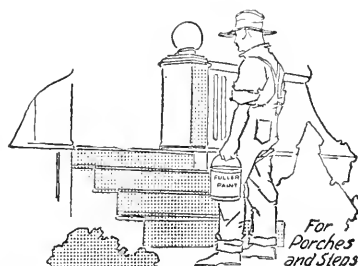
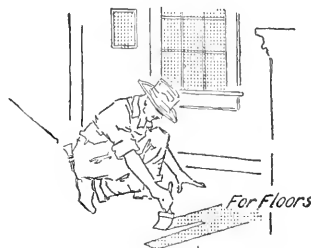
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Northwest Fruit Notes from Here and There

OREGON

Hood River apple growers figure that the increase in freight rates will cost that section an additional \$200,000 this year. The increase will apply to about 75 per cent of the crop from that district which will move to points east of the Mississippi river and also to shipments that will go to California.

The sale of the J. D. Housley pear orchard at Medford to County Pathologist C. C. Cate is reported. The orchard consists of 40 acres in pears in a fine state of cultivation and the sale price as announced is \$223,000. Another sale of orchard property in the Rogue River valley recently of more than usual interest was the transfer of the Austin Corbin ranch near Eagle Point to Fred C. Bell, a Chicago capitalist. The Corbin ranch consists of 250 acres, 49 of which are in pears, 71 in apples and 30 in grain. The remainder is in meadow and woodland. The sale price was \$80,000, according to the reports from that section. Mr. Bell, it is stated, expects to manage the ranch personally.

Two Royal Anne cherry trees at Roseburg, Oregon, are said to have netted their owners \$250 for their fruit this season.

According to the announcement of a local fruit buyers at Salem, the loganberry crop within a radius of ten miles of that city amounted to 6,600,000 pounds of berries and should return to the growers at the prevailing price of 13 cents per pound approximately \$850,000.

Reports from The Dalles are to the effect that there has been a very marked recovery by the orchards in that section from the effects of the extreme cold of the past winter and that the damage was practically limited to cherry trees.

It is estimated that \$10,000 will be distributed this year among the farmers and orchardists in the Hermiston district from honey sales. The bees, to produce this honey, were pastured on the alfalfa fields and orchards in the Unatilla project in this section, which was developed some years ago.

A number of the leading handlers of fruit in the Rogue River valley have recommended that all fruit to be packed in that district be wiped before delivery to the packing houses. This action has been taken to meet the objections of some of the eastern horticultural inspectors against fruit showing an excessive amount of arsenate of lead spray.

The pear harvest in the Hood River valley, which commenced the latter part of August, as well as the harvest of Kings and Gravensteins, is said to be showing a considerable reduction as compared to the early crop of pears and early apples last year. The pear crop in the Hood River valley is now estimated at about 15 per cent of that of last year, when something over 113 cars were shipped. The harvest of the main apple crop in this section is expected to begin this year about October 1. There will be sufficient local labor, it is stated, to handle the pear crop and outside help will not be needed until October.

The Myrtle Point district is figuring that when the evergreen blackberry crop is fully harvested between \$15,000 and \$18,000 will have been paid out for this fruit in that section. The berries are being handled by the Myrtle Point cannery.

While most people do not in any way connect the Tillamook country with the fruit business, considerable interest is being taken there in developing the berry business. There

were about 50 acres in loganberries in the Tillamook country this year and the nearby foothills produced \$15,000 worth of blackberries. The moist climate of the Tillamook country seems to be especially adapted to the growing of loganberries, which attain a larger size than in any other section of the state. Loganberries at Tillamook attain a size of 1½ to 2 inches and in addition yield heavily. The berry products of the Tillamook country are being largely handled by the Graves Canning Company, which has a small plant located in the Cheese City. A beginning has also been made in this district in growing strawberries.

The prune crop in the Sheridan district, which will be largely handled this year by the Oregon Growers Cooperative Association, is expected to be largest in the history of that section. A 40-bushel dry, which the association is having erected there, is rapidly nearing completion and will greatly aid in solving the dryer problem of the growers, which last year was serious. There will also be a large apple crop in the Sheridan district of fine quality this year.

The pear crop of the Rogue River valley, the harvesting of which was started about the middle of August, will total 700 cars, according to local estimates. The shipment of apples is expected to reach 500 cars. The yield of pears, it is stated, is 15 per cent greater than was anticipated early in the season. Mention is made of the fact that for the first time in the history of the fruit business in Oregon solid trainloads of pears were shipped this year from the Southern and Western Oregon districts.

F. L. Kent, field agent for the bureau of crop estimates, places the Oregon apple crop at 3,425,000 boxes for 1920. Of this estimate, Mr. Kent reports that about 60 per cent is of commercial quality. The 1919 apple crop was 3,579,000 bushels, showing that there is a big falling off in the estimate for this year's crop.

SPECIFICATIONS

Weight: 166 lbs.

Material: Carefully selected Western Fir and Pine. Oversize wrought iron shafting and rods used throughout. Castings carefully moulded in our own foundry with a view not only for appearance, but great strength.

Finish: Handsomely finished with three coats of high-grade paints and varnishes.

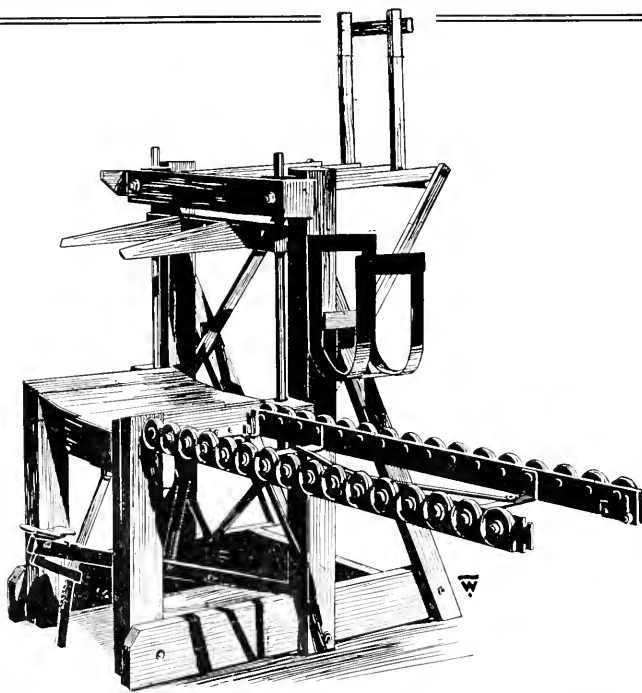
Floor Space:

Depth, 40 ins.

Height, 50 ins.

Width, 26 ins.

The Success Box Lid Press is as fine a product for the Orchardist, the small and large packing house, as ingenuity and thorough investigation, combined with long experience, can produce. It is equipped with stripper rack, folding shelf for lids and cleat holder rack, with lugs on both sides and back for gravity conveyor.



CAPACITY

For the rapid, economical and convenient handling of fruit boxes of various sizes at highest speed.

Adjustable arms of great strength and rigidity makes this possible.

Automatic positive patented foot clutch, single pedal, reversible ratchet and dog add immensely to both speed and durability of the press.

Pressmen who have used them, claim the Success will outlast and outwork any other press on the American market. It receives or delivers boxes from either side or rear over a frictionless curved metal bottom, which eliminates the necessity of ever having to lift the box as it is being received or delivered. This press will positively cut your expense and increase your profits.

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Dealers, write for territory. Good sales assured.

SUCCESS SEED GRADER CO., Inc.

Manufacturers: Success Seed Graders, Pea and Bean Threshers and Orchard Supplies
SPOKANE, WASHINGTON

Cherry orchardists at Cove, who, in 1917, signed a three-year contract to market their cherries for \$80 per ton, are said to have seen their fruit this year sell on a ready market at \$200 to \$150 per ton.

The Oregon Agricultural College, which will hold its horticultural show November 5 and 6, is planning to have it outdo all former exhibits. An attractive program and premium list is being arranged and the college announces that it will pay express charges on all fruit sent it for exhibition, but will retain the fruit after the show for its own use.

Strawberry plants for fall setting are reported to be in strong demand, although prices are ruling high. The strawberry acreage that will be set in the state this fall and next spring it is reported will be extensive.

Clayton L. Long, formerly of the University of Ohio, has been appointed extension horti-

cultural specialist at the Oregon Agricultural College. Mr. Long took up his duties at the O. A. C., August 1st.

The prune crop of Oregon and Clarke county, Washington, for this year, is estimated by C. I. Lewis, organization manager of the Oregon Growers' Cooperative Association, at 60,000,000 pounds of dried fruit. The Oregon prune crop, as estimated from other sources, is placed at 50,000,000 pounds. The apple crop of Western Oregon is placed at 1000 to 1100 cars.

Open air meetings and picnics of the members of the Oregon Growers' Association, which were held during the month of August at Salem and Roseburg, were well attended. Interesting programs were provided. The principal speaker at the Salem meeting was Dr. F. M. Coleman, editor of the Sunsweet Standard, house organ of the California Prune and Apricot Growers' Association. Others who

were on the program to speak were Senator Charles L. McNary, Prof. H. P. Barss, Prof. A. L. Lovett and C. I. Lewis.

WASHINGTON.

Apricots and peaches from the Yakima valley, which went on the market in the early part of August, brought good prices according to a report on crops and crop movements in Washington, made by M. L. Denn, chief of the state division of horticulture. Early prices for apricots reached \$150 per ton, although later the price declined. The prices received for peaches ran from \$100 to \$125 per box. Contract prices for Bartlett pear canning stock were started at \$70 per ton, with later offers of \$90 per ton reported. The Bartlett pear crop in the Yakima valley is variously estimated at 900 to 1200 cars. Believing that this is a year when grade will cut a big figure in the price of box apples, Mr. Denn is warning growers to bring both grade and pack up to the top notch. Owing to the uncertainty of transportation conditions, apple buyers, he says, will insist on the fruit being in the best possible condition before it leaves the point of production.

The melon acreage in the state of Washington showed a considerable increase this year over that of 1919. Approximately 2,000 cars of cantaloupes and 500 acres of watermelons, it is estimated, will be shipped during the present season.

Wenatchee is one of the Washington districts that has a bumper crop of pears and 550 carloads are reported to have been contracted for in that district at prices ranging from \$70 to \$80 per ton.

With the other fruit-shipping districts in Washington, Wenatchee is entering a strong protest against the recent increase in freight rates on apples. It is estimated that this district will have to pay from \$1,350,000 to \$1,875,000 more in freight rates under the increase than it paid last year.

The second annual prune harvest festival, which will be held under the auspices of the Prunarians, will take place at Vancouver, Wash., this year, September 16 to 18. In addition to the entertainment that will be provided for visitors, there will be cash premiums offered for fruit, nuts, vegetables and other farm exhibits, as well as boys' and girls' club displays. A canning exhibit will be another feature.

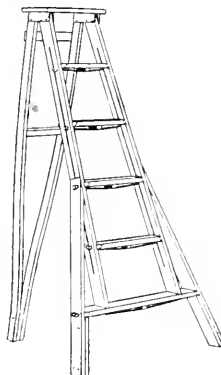
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Light and strong, clear, well-seasoned spruce, re-inforced under each step, wide spreading side legs makes this the ideal picking ladder. Your pickers will work faster because they know they are safe.

The Hardie Mfg. Co.

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Fruit Growers Eliminate the 3 Bs

BUMPS and BRUISES

If one BUMP equals one BRUISE, if one BRUISE equals the difference between Extra Fancy and Fancy apples, if that difference equals a material difference in your profits then you have REASON No. 1 why you should haul your apples in a two-ton pneumatic tired GMC TRUCK.

BUGS

If the BUGS on your fruit trees in the spring of the year affect your crop then you have REASON No. 2 why you should buy a GMC TRUCK and equip it with an ordinary three-cylinder pump with a 200-gallon tank on a sub-frame and spray with a saving of 60% over horse operation.

Think over these two reasons and then INVESTIGATE GMC TRUCKS BEFORE YOU INVEST.

Seattle **ELDRIDGE Buick SALES CO** Yakima
Spokane **SALES CO** Walla Walla

GMC ON A TRUCK IS LIKE USA ON A BOND

H. A. Glen, agent of the Northern Pacific at Yakima, has completed his estimate of leading crops of the Yakima valley which will require refrigerator car service. Mr. Glen says there will be 150 cars of peaches this year, as compared with 2,000 last year; 425 cars of melons and cantaloupes as compared with 100; 500 cars of mixed fruit as compared with 350; between 10,000 and 11,000 cartloads of apples as compared with 11,510 cartloads last season. Mr. Glen's apple estimate is generally accepted with surprise. Most orchardists had believed the crop this year would be far less than that a year ago, but Mr. Glen explains the fruit will be larger and there will be fewer culls, though probably not so many apples.

Many Washington shippers are said to be already making preparations to secure space in refrigerated steamships sailing from Seattle to New York, via the Panama canal. In case the full increases in freight rates granted to the railroads stay in effect, it is claimed apples can be shipped much more cheaply by steamer through the canal than by rail.

The Wenatchee section of the Spokane fruit district, comprising Chelan, Okanogan, Douglas and Grant counties, will produce only 9,533 cartloads of apples in 1920, compared with 12,500 cars raised last year, according to District Horticultural Inspector P. S. Darlington's estimate recently completed. Virtually every portion of the district shows a decrease. Wenatchee and vicinity, which last year grew 3825 cars of apples, will have only 2650 this year. Cashmere shows an increase from 1392 cars last year to 1500, forecast for 1920. Omak shipped 663 cars last year and will have only 450 this year. Okanogan drops from 350 to 200. Brewster from 332 to 250. Enlat from 577 to 450. Pateros from 440 to 275. Olds from 828 to 600. Dryden from 480 to 350 and Peshastin from 460 to 350, according to the estimate. Monitor indicates a slight increase from 628 cars last year to an estimated crop of 700 cars this year. Mallott, Wagnersburg and Chelan Falls all have the same estimated yield as last year, and Chelan, which yielded 481 cars last year should have an increase to 500 this year, according to the July estimate. Grant county will just about hold its own with about 300 cars. The Moses Coulee section will ship 122 cars, the same as last year, it is estimated. The yield of summer fruit in the district this year is given as 1,000 cars, compared with about 1,100 cars last year. Pears show an estimated increase from 500 to 550 cars, cherries are the same at 100 cars, but peaches and apricots show a heavy falling off.

The first Winter Banana apples of the season were shipped out of Wenatchee July 29 for Alaska. This is the earliest shipment of winter apples out of the district by about 10 days.

A number of new fruit warehouses, costing several thousand dollars each, will be erected by the Spokane Fruit Growers' Company, according to an announcement by Luther N. Flagg, president. The new buildings will be erected to handle this season's apple crop and will be located in several of the districts included in the organization of the Spokane fruit growers.

Despite unusually dry weather, the apple crop in Arcadia is reported to be looking unusually promising. It was found necessary in some sections, to do considerable thinning to secure a good harvest of extra fancy stock. Work on the warehouse, 60 by 100 feet, at Arcadia is progressing. The structure will be completed by October 1. The growers' association begins at once the erection of another warehouse at Denison to care for the harvest at that point. This building will be 50 by 130 feet, of concrete construction.

**Meet Me at the
Big Hood River Fair
Sept. 17th and 18th**

TREES AND SHRUBS



Fruit trees budded from bearing orchards. Apple, Pear, Cherry, Peach, Plum, Prune, Apricot, Quince, Grape Vines, Strawberry, Plant, Raspberry, Blackberries, Logan, Dewberries, Asparagus, Rhubarb, Flowering Shrubs, Roses, Vines, Hedge, Norway Spruce, Yew. Carriage paid. Satisfaction guaranteed.

WASHINGTON NURSERY CO.

Toppenish, Washington.

Salesmen everywhere. More wanted.

Expert Orchard Service

We contract the planting and care of Nut Groves, Fruit Orchards and Berry Farms.

Run down properties inspected and methods of renovation outlined.

Inspection of orchards for absentee owners and for prospective buyers.

Sales of choice Nut, Fruit and Berry Properties.

(We are Agricultural College Graduates
with a wide orcharding experience)

PEARCY BROS., Salem, Oregon

The Real Pruner

Fastest, Smoothest Cutting and Most Powerful Practical Pruner on the Market.

A Real Pruner That Makes Pruning Easy.
SAVES TIME, TREES AND MONEY

WHY?

BECAUSE—

It makes a perfectly smooth cut and does not crush the fiber, thereby leaving the ends of the limbs open to the ruinous attack of insects.

It has a steel hook that will not bend out of line.

Both hands on the pruner at all times gives perfect control. The instant you hook over a limb you cut it off no matter at what angle.

No limb too hard or tough. It cuts them easy.

Simple in construction. Nothing to get out of order.

Always open.

All parts are die stamped and interchangeable and can be replaced at any time.

Endorsed by pruning experts.

It Has No Competition—One Demonstration Proves It All.

The Real Pruner will be demonstrated at the Oregon State Fair, September 27-October 2. Do not fail to see it.

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NEW CROP —

SEEDS

Vetches, Alfalfa, Clovers, Grains, Grasses

Selected Reclaimed Farm and Field Seed at Lowest Market Prices.

Special Mixtures for Wet Land—Dry Land—Burns—

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OUR SEED LABORATORY is in charge of a skilled analyst and all "DIAMOND QUALITY" Seeds are TESTED for PURITY and GERMINATION

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PORTLAND SEED CO.
PORTLAND, OREGON



Western Agents "CLIPPER" FANNING MILLS

IDAHO.

H. A. Lyon, director of the Bureau of Markets, has issued a statement in regard to Idaho's fruit crop prospects, in which he says:

"Idaho anticipates a bounteous harvest this season and if prices remain good, farmers of the Gem state are bound to be prosperous, as an excellent crop from the field and the orchard is the present outlook.

"For the first time, the true orchard acreage of the state is known and files of the Idaho Department of Agriculture give a description as to acreage and varieties of every orchard. These records show 26,759 acres of apples, 3,962 acres of Italian prunes, 308 acres of cherries, 480 acres of peaches, 50 acres of apricots, and 284 acres of pears, or a total of 31,848 acres. With such records as a guide, it has been possible to make a worth-while estimate of production from the visitation and reports of 22 horticultural inspectors.

"The detailed estimate shows 4,769 cars of apples, 1,819 cars of prunes, 61 cars of cherries, and 5 cars of pears, with peaches a minus quantity, because of severe winter killing. However, when deductions are made for home orchards and home consumption, it appears that Idaho will ship about 4,000 cars of apples, or approximately the same amount as last year. In 1919, the Boise valley had a small crop, while the Payette section, includ-

ing Fruitland, had plenty of apples, but this year the tables are turned about and the Boise valley has a bumper crop of both apples and prunes, with an estimate of somewhere near 800 cars of apples and 1,000 cars of prunes.

"Nineteen twenty has seen the Bureau of Plant Industry putting over as good a campaign against orchard pests and diseases as any state can boast of, and it is expected that the four or five hundred cars of culls of 1919 will be reduced to less than 100 cars for the present season. Through the efforts of the State Department of Agriculture in its rigid inspection of shipments, as well as orchards, fruit growers have come to a realization that thoroughness and caution are essential if fruit growing is to be profitable.

"Few states, if any, have as extensive and efficient a system of grading as does Idaho and fruit growers as well as farmers in general are rapidly coming to a real appreciation of the superior prices which come from the production and sale of products of real quality."

The harvesting of early apples has commenced at Lewiston, Idaho. For the first time in several years a considerable part of the crop will be labeled "half-marked," as the western section of Lewiston orchards was hit by a severe hail storm several weeks ago.

With the cherry crop in the Lewiston, Idaho, district at about half its normal output, it is estimated that the tonnage from the valley reached 90 carloads this year. Included in the canner pack. Sixty-two carloads were shipped out by the American Express Company, and the Oregon Packing Company says it canned 100 tons of the Clarkson cherries alone. The shipment of cherries in barrels was an important item at Lewiston this year. Approximately 500 barrels of 250 pounds each, or a total of 125,000 pounds, in from seven to eight carloads, were shipped by Railway and Wicks of this place to the Puyallup Fruit Growers' Association, at Puyallup. These were all of the Royal Anne variety.

Contracts have been made at Latah, Idaho, at \$60 a ton bulk for pears, the growers picking the pears in boxes furnished by the cannery and delivering them to the railroad.

What They Are Doing In California

The California apple crop is estimated this year at 3,500,000 boxes, as compared to about 5,000,000 boxes last year.

According to a statement from the California Peach Growers' Association, the opening prices on dried peaches for 1920 should net growers 17 cents a pound as against slightly less than 15 cents a pound in 1919.

The prune crop in Butte county, California, is said to be exceptional this year in that 80 per cent of the crop is averaging 50s in size. A heavy percentage of the crop will run to 30s and 40s, it is predicted.

Another dehydrating plant, which will be erected at Paso Robles, California, will adequately take care of all the fruit and vegetable tonnage in that district. With the building of the new plant, Paso Robles will have three drying plants.

In the San Luis Obispo district one firm has placed an order for 30,000 almond trees to be planted this fall, and it is stated that there is a probability of the record-breaking one of 1,000,000 almond trees in this county this season. A large cannery is also in prospect in this district to take care of a prospective planting of 1,000 acres of tomatoes.

The chambers of commerce in many of the districts in California have started a campaign to insure labor for harvesting fruit and have very materially assisted ranches in getting the needed help during the fruit season.

Priees for the 1920 prune crop which were recently announced by the board of directors of the California Prune and Apricot Growers, Inc., assure the prune growers who are members of the association another golden harvest equal in value to the record-breaking one of last year, according to a statement just issued by the association. The prices named are three cents a pound higher than last year's prices on 20-30's, from a cent to a cent and a half higher on the next tree sizes, the same price as last year for 60-70's and slightly lower on the smaller and less desirable sizes. On sizes from 20-30's to 100-100's inclusive which usually comprise about 73 per cent of the crop, the average price for this year's crop is one and a third cents a pound above the price the growers received for these sizes last year. The prices announced for 1920 crop of prunes are: Sunsweet quality, 20-30's, 25 cents a pound flat; 30-40's, 17 cents bulk basis; 40-50's, 15 cents bulk basis; 50-60's, 13 cents bulk basis; 60-70's, 11 cents bulk basis; 70-80's, 10 cents bulk basis; 80-90's, 9 cents bulk basis; 90-100's, 9 cents bulk basis. Growers' Quality was set a half a cent a pound less than Sunsweet.

Bits About Fruit, Fruitmen and Fruitgrowing

There were 10,200,899 pounds of shelled walnuts, valued at \$5,317,276, imported into the United States during the calendar year 1919. The greater amount of these walnuts were imported from France.

According to reports from the eastern barrel apple-raising districts there is a gain of nearly 4,000,000 barrels of apples over the crop of last year. The information is also forthcoming that barreled stock will be more carefully guarded this year than formerly. This is said to be particularly true in the eastern states, where the competition between box and barreled fruit is the keenest.

Notwithstanding the fact that attention has been repeatedly called to the fact that it is necessary to take extra care in preparing box apples for export, the United States Bureau of Markets is again warning shippers to select the strongest boxes for the export trade and to have them secured with iron straps.

J. & H. GOODWIN, LTD.

Apple Exporters

Headquarters in United States
60 State Street
Boston, Massachusetts

*The Largest Handlers of American Apples
in English Markets*

You can send your apples direct from the United States into the industrial centers of England. The same organization (J. & H. Goodwin, Ltd., throughout) which ships your fruit from the U. S. A., sells and distributes in London, Liverpool, Manchester and Hull, and on the European Continent.

This means quick handling, considerable economies and the fruit being sold in the freshest possible condition, which means greater returns.

For dependable export information write or wire us at 60 State St., Boston, Mass. or 97 Warren St., New York City.

The Northwestern Lid Press

The last operation in harvesting should be done with extreme care. No other press will give you as perfect pressed and lidded boxes as the Northwestern. A pack of which you can be proud.

The automatic lid placing device insures accurate placing of the lids. Enables the operator to properly lid more boxes in a day.

Anyone can be an expert on a Northwestern Press.

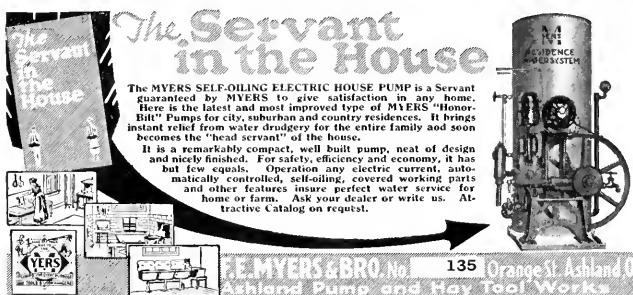
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It is a remarkably compact, well built pump, neat of design and nicely finished. For safety, efficiency and economy, it has but few equals. Operation any electric current, automatically controlled, self-oiling, covered working parts and other features insure perfect water service for home or farm. Ask your dealer or write us. Attractive Catalog on request.

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We can furnish standard apple boxes, crates and cases of selected material, well manufactured. Standard or special shook to order.

Our prices are right. Write today for our list.

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WHEN WRITING ADVERTISERS MENTION BETTER FRUIT

The long haul to the Atlantic seaboard, loading the boxes on the ships and the additional railroad haul on the other side of the continent makes it necessary to have the export packages of fruit securely packed and bound.

The International Apple Shippers' convention, held in Chicago during the middle of August, was one of the most largely attended in the history of the organization. The new officers of the association are: E. T. Butterworth, of Philadelphia, president; D. N. Minick, Chambersburg, Pa., vice-president; George W. Davidson, New Orleans, treasurer; R. G. Phillips, Rochester, N. Y., secretary. The executive committee are: W. L. Wagner, Chicago, chairman; Wayne M. French, New York; J. J. Castelli, Cincinnati; E. H. Neustadt, Milwaukee; Edgar W. J. Hearty, Boston.

An announcement from Consul General Skinner at London is to the effect that the British Food Controller has released both domestic and foreign apples from price control in Great Britain from August 1 to November 1, after which the maximum control retail price will be resumed, at 20 cents instead of 18 cents per pound. A new schedule of wholesale prices on fruit is said to be in course of preparation.

The New York State Evaporators' Association, which handles one of the largest outputs of dried apples in the country, looks forward to a successful season, according to a statement made by The Evaporator. It is not believed, however, that although there is a much larger prospective crop of apples for drying, that prices will rule much lower than last year, when 1 1/2 to 18 cents per pound was paid for the loose product.

A noted visitor to the Northwest during the month of August, who is interested in the fruit industry, was Emilio Schenk, professor in an agricultural institution in Brazil. Professor Schenk, who visited Southern Oregon, Hood River and other sections, spent his time studying apple and pear culture. He investigated the light resistant pear stocks, which Professor F. C. Reimer is developing at Talent, Oregon. Professor Schenk made the statement that Brazil has 100 different kinds of pears and apples under cultivation, but that few commercial orchards have been developed so far. The citrus fruit industry is largely engaging the attention of fruit growers in that country at the present time, according to Professor Schenk.

Cannery Notes

The Rupert cannery at Lebanon, Oregon, which this year was greatly enlarged, will handle a large tonnage of canning products in that district. The company is stimulating the interest of ranchers there in planting fruits and produce and expects that its intitution at Lebanon will eventually be one of the largest if not the largest in the state. It receives its products from a widespread territory around Lebanon as well as shipments from other sections of the Willamette valley. A large quantity of loganberries were put up this year and its output of blackberries is expected to be one of the largest in the state.

The cannery of the Puyallup and Sumner Fruit Growers' Canning Company at Albany successfully opened its canning season during July. The establishment, which is a large and modern one, employed 200 girls during the height of the season. Before the blackberry season closes it expects to handle 500 tons of this fruit.

About eight tons of loganberries and an equal quantity of cherries was put up daily by the plant of the Brownsville Canning Company at Forest Grove this year, during the season for these fruits.

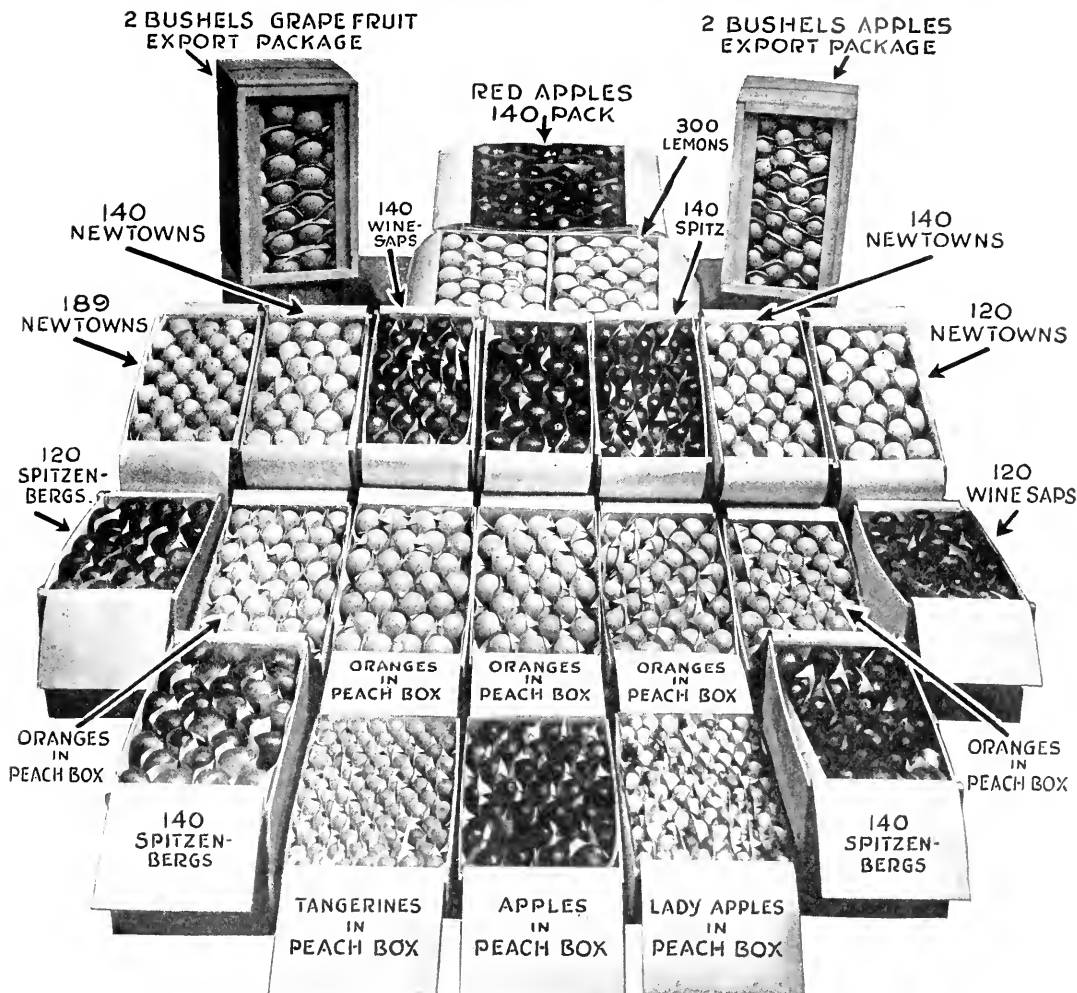
The cannery of the Eugene Fruit Growers' Association is reported to have canned a cherry crop of more than 2,000,000 pounds this season. This is said to be the largest pack of cherries ever put up by a fruit cannery in Oregon. Eugene growers are reported to have received about \$250,000 for their cherries this year.

The plant of Libby, McNeil & Libby at Yakima, Wash., established a national record for the quantity of cherries canned this season, according to G. B. Rile, superintendent, who says over 739 tons of cherries were handled, as compared with 660 tons in 1918.

Ten tons of cherries a day is the canning record this season of the cannery at Coeur d'Alene, Idaho.

At the price of loganberries this year, growers in the Willamette valley section of Oregon received large returns from the canneries for their product. It is reported that for one week's delivery of loganberries a grower in this district received a check for \$19,863.

- SYKES SYSTEM OF FRUIT PACKING -



Ample Protection Proper Ventilation Thorough Refrigeration
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WHEN WRITING ADVERTISERS MENTION BETTER FRUIT

Picking and Handling Fruit in the Orchard

By C. B. Woods, Formerly Horticultural Inspector in Washington

A FEW brief statements on picking and handling fruit in the orchard should be of interest and value to growers.

In the first place growers should be equipped with good picking ladders for each picker. Climbing into the trees is a bad practice and should not be permitted as many fruit spurs are broken off in this way and branches scarred, making splendid quarters for insects, especially woolly aphis. Oftentimes the weight of a person bends the limbs down so much that the cambium breaks and the branches remain drooping instead of swinging back in place when relieved of their burden of fruit. Many branches are broken down entirely under the weight of a picker, hurting the shape of the tree. If a tree is properly trained, ladders can be placed so as to enable one to pick the entire crop without any trouble. A large part of the crop can be picked from the ground in most cases. However, a picker should not be allowed to pull down on the branches as this may result in as much damage as climbing.

Picking bags have not been a success for when filled with fruit they are subject to many bumps, each bump causing a loss of a dozen or more apples by bruising. Many times it is necessary to cull out from 50 to 60 per cent of a crop because of bruises and this means a big loss to the grower. A picking bucket has given much better results and saves a lot of fruit.

Every fruitgrower is anxious to realize as much as possible from his orchard. To do this he must give the trees a great deal of care and attention. In picking the fruit, do not take off all the fruit spurs as well, even though you may intend to sell your orchard soon after harvest for the new owner will be just as anxious to harvest good sized crops from these same trees. "A sheep shearer doesn't skin the sheep just to get the wool," though I dare say some of them are almost as bad as some apple pickers. Often a trunk full of spurs is found scattered under a tree after a day's run and it takes from three to four years to grow a good sturdy spur. In picking take the apple in the palm of the hand, not letting the tips of the fingers touch the fruit. Don't pull, but simply lift and turn the back of the hand toward the spur just a little and the apple is yours. It is much quicker and easier to do it this way

and means better crops in the future.

All wheel conveyances should by all means be equipped with good springs for fruit hauling. All irrigated fields should have roads run through them with a spring tooth harrow or an orchard cultivator just before picking time. This will help to cut down your cull pile to a great extent.

Care should be taken not to make boxes too full and then setting other boxes on top of them. This will not only bruise a few apples on top, but will hurt practically all the apples in

the box. Apples which have just been picked should not be left in the orchard exposed to the sun as they will sunburn quickly and this hurts their keeping quality. If there is no shelter in the orchard, get them out of the fields as fast as possible and place them in your packing house. Stock the fruit in such a way that it will have a good circulation of air. See to it that you have ample ventilation and give the place plenty of cool night air.

Take care of the culls as fast as they accumulate as the worms are leaving the apples at this time in search of winter quarters and the packing house is usually good life insurance for them.

The Transmission of Power

A transmission belt that will give continual and satisfactory service, will pay for itself in one season by eliminating costly shutdowns, etc. If you can depend upon your belt you are relieved of all worry. Don't peg along with a makeshift. You are losing money every day.

"TEST SPECIAL" RUBBER BELTING

No need to worry when there's a "TEST SPECIAL" on the job. Always running. No breaks, or shutdowns. TEST SPECIAL is guaranteed to give longer and better service than any other rubber belt made.

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OUR FREE SERVICE DEPARTMENT

Write us your belting trouble. We maintain a Department whose sole duty is to answer your queries.

WRITE TODAY, giving the R. P. M. and diameter of the driving pulley—also driven pulley and distance between centers of same; also give the rated horsepower of your motor or engine, and name kind of machinery you are operating. We will reply immediately giving you our recommendation as to kind of belt to use.

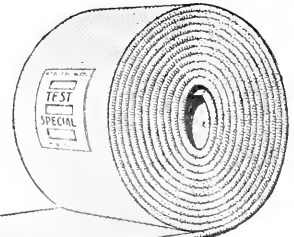
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Fruits, Vegetables, Flowers, Livestock,
Grains, Trucks, Tractors, Machinery,
Automobiles, Art, Amusements.

Observations On the Evaporation of Prunes

Continued from page 5.

high as twenty-two per cent without any apparent injury to the keeping quality of the prunes. It is desirable to have as high a moisture content as is compatible with good keeping qualities. As a rule, the prunes having the higher moisture content seem to have the better quality. It is to the interest of the growers that the best quality of prunes possible be placed on the market. The moisture must be dried out to a point where the prunes will keep well, but a point higher than that is undesirable both from the point of view of the quality of the fruit and from the point of view of profit to the growers. Table IV shows the effect of the drying time on the average weight per bushel secured in some of our prunes used in experiments.

TABLE II.—EFFECT OF DRYING TIME.

No. of Trays	Drying Time	Av. Wt. per bu.	Drying
174.....	29 hrs. 13 min.	26.54	34.21%
235.....	36 hrs. 35 min.	19.88	33.13%
611.....	45 hrs. 00 min.	19.28	32.13%
325.....	52 hrs. 8 min.	19.20	32.00%
202.....	77 hrs. 00 min.	18.49	30.81%

The figures given in Table II were taken from data collected over a period of two years and represent the number

of trials in each case. The gradual decrease of the drying percentage as time increases is probably a true indication of what may be expected with evaporation methods commonly practiced. Where prunes are dried very slowly, they have a tendency to take on a dull, unattractive appearance, and during the season of 1914 mold appeared on such fruit. With such prunes the temperature had probably been kept altogether too low.

Drying Time Important. There seems to be very little change in the drying percentage until the drying time becomes abnormally long. There is, how-



THE GREAT OLYMPIC FEED MILL
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OLYMPIC SCRATCH FEED

Gives Your Hens an Even Break

YOU don't expect blood from a turnip. Likewise, unless you have supplied your fowls with plenty of backbone and strength, you cannot expect continual egg production. The best egg mash or tonic only assists the hen—it takes a strong, robust constitution to withstand steady laying. Such constitutions are the result of feeding **OLYMPIC** Scratch Feed.

This strength-building feed contains the following properly balanced ingredients: Wheat, Cracked Corn, Milo Maize, Hulled Barley, Hulled Oats, Sunflower Seed and Buckwheat. Made from carefully selected whole grains, cleaned and well mixed, you'll find no better poultry feed than **OLYMPIC** Scratch Feed. Every handful is uniform and free from dust.

OLYMPIC Scratch Feed comes in three classes or grain sizes. Baby Chick Scratch, with tiny but uniformly ground grains, suited for the first three week's feeding. Growing Chick Scratch, a little coarser grains, that appeal to the growing youngsters until about eight weeks old. Is the next step. From Growing Chick Scratch they graduate to the full sized grains of **OLYMPIC** Scratch Feed.





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ever, a marked difference in the appearance, texture, and flavor of the fruit. These seems to be better where the drying time is relatively short, and less favorable where the drying time is increased. It must constantly be borne in mind, however, that shortening the drying time will not always give a higher drying percentage; for if a dry, parching heat is used from the start to finish, the prunes will have a distinctly tough skin, glossy, black color, but will dry away badly. The drying time seems to be of very little importance except to show the presence or absence of ideal conditions. If all conditions are

favorable for good evaporation, the process will be fairly rapid and the drying time relatively short. If the drying time is abnormally long, the operator should know that either his methods are not the best, or else the building is faulty in construction.

There seems to be little change in the appearance of the prunes during the last six or eight hours of drying. As the amount of moisture in the fruit becomes less, the amount evaporated in a given time also becomes less and the air is not cooled as rapidly as was true when the prunes were giving out lots of moisture. The greatest loss of mois-

ture seems to occur when the humidity of the air is between ten per cent and fifteen per cent. Finishing the product in a high, dry, parching temperature, seems to produce a less desirable fruit.

Economies Possible. The air at the lower or finishing end of the tunnels is practically dry at all times. A slight increase in humidity was observed when the weather was clear and warm, over that noted when cold, rainy weather prevailed. A greater difference prevailed, however, at the upper or starting end, where during clear, warm weather, the humidity of the air was about thirty per cent, but during cold,

The Complete Dormant Spray

—controls fire blight as well as scale

DISCARD knife and saw and paint as a remedy for fire blight. You can control fire blight, collar rot and other orchard troubles with Scalecide — "the complete dormant spray."

Scalecide kills the hold-over cankers that cause twig and fire blight. It cleanses and disinfects the canker; it causes the old, blackened bark to peel off and new cambium to form. No other spray does this.

What Scalecide Does

Scalecide kills scale, insect eggs and fungous spores that winter over on the bark. It cleans up the trees so thoroughly that their increased vigor is strikingly noticeable the following season. The Fall application kills the adult Pear Psylla before it lays its eggs. A Spring spraying, just as the buds show green, kills aphids. Either of these applications controls blight.

Penetrates and Invigorates

Scalecide is a soluble and miscible oil — not only an insecticide for scale, but it has both fungicidal and germicidal properties. And because the oil globules are broken up into such microscopic particles they are able to penetrate the diseased bark and tissues, and thus reach the bacteria that cause fire blight. Scalecide actually *penetrates and invigorates* the plant tissues.

Saves Labor

One barrel of Scalecide does the work of three and a half barrels of lime-sulfur. 800

gallons of Scalecide (diluted 1 to 15) goes farther than 1,600 gallons of diluted lime-sulfur, and of course you can put on 800 gallons of Scalecide in much less time than 1,600 gallons of lime-sulfur.

Protects Your Spray Pump

Lime-sulfur eats out the valves and other parts of the spray rig with which it comes in contact. It causes the spray hose to crack and go to pieces. Scalecide, because it is an oil, helps to protect the spray pump from wear and tear and prolongs its life; it makes the pump run easier and develop higher pressure.

Pleasant To Use

Lime-sulfur burns the hands and face, often injures the eyes, takes the hair off the horses and eats the harness — it is extremely disagreeable to use. Scalecide soothes the skin, does not injure the eyes, improves the hair on the horses, softens and cleanses harness — it is *pleasant to use*.

We Own 26,000 Trees

For ten years we have been conducting spraying tests in our own large orchards, which now total 26,000 trees. The most important result of this practical work with Scalecide in our own orchards has been to discover and confirm many valuable properties of Scalecide: its invigorating effect upon the trees; its economy; its effectiveness against fire blight; and its unequalled effectiveness against insects



and diseases of all kinds that winter on the tree. We recommend Scalecide to you as *fruit growers*.

Get Scalecide Now

See your dealer now. If he doesn't sell Scalecide, write us for booklet, prices and Guarantee; also give us his name. Use coupon below. Don't delay. Last year fruit growers wanted more Scalecide than we could supply. Address Dep't 25.

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SCALECIDE

THE COMPLETE DORMANT SPRAY

SCALECIDE

"Makes a Tree Outgrow Its Troubles"

(Coupon)

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Gentlemen: Please send me prices, copy of Guarantee and free booklet on Scalecide, "Figuring the Cost of Spraying." I have.....

bearing trees..... young trees. I have been using..... barrels of..... (number) (kind of spray)

My dealer is:..... (Name) (P.O.) (State)

Name..... P.O..... State.....

rainy weather the average was about fifteen per cent to twenty per cent and at times ran as low as five per cent. These facts become important when we consider the importance of returning some of the heated air, passing it over the fruit a second time. By mixing some outside air with that already heated to 135 degrees and passing this mixture over the furnace, the humidity could be controlled and the amount of heat required lessened.

When air is taken in the furnace pit at a temperature of forty-five to seventy degrees, which commonly occurs during the period of evaporation, a large amount of heat is required to raise the temperature to 160 degrees. Since the air passes off at the upper end at a temperature of 120 to 140 degrees, a large amount of heat is lost. The removal of the moisture from the air by condensation is doubly expensive in that the cost of cooling is added to that of reheating air from a low to high temperature. If, by the use of forced air currents, the greater part of the air could be returned to the furnace pit at a temperature of 120 degrees or better, much of the cost of heating could be reduced. Possibly methods will be evolved, some time, so that much of the heat which is now entirely lost can be used.

As soon as the prunes are finished they should be removed from the trays while still warm, the dobies should be re-trayed and re-dried. The prunes are then taken to the bins or piles to cure until sold or ready for processing.

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Big Hood River Fair
Sept. 17th and 18th**

UNQUESTIONABLY—

Modern methods applied to fruit growing have made the Northwest a great fruit growing center, with possibilities of extensive development.

Modern methods applied to banking have made the **FIRST NATIONAL BANK** pre-eminently the ally of the horticulturist. Its facilities, service and the personal interest of its officers are at your disposal.

**THE FIRST NATIONAL BANK
OF PORTLAND OREGON**
THE FIRST NATIONAL BANK WEST
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OREGON STATE FAIR

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Red Crown gasoline has a continuous chain of boiling points. It is an all-refinery gasoline.

STANDARD OIL COMPANY
(California)

Operating Air-Cooled Apple Storage Houses

Continued from page 10.

through the vents and air shafts at the ceiling.

This action is almost exactly the same as in an ordinary chimney, the only difference being that the air in the ventilating flue is not nearly as warm as that in the chimney; therefore, the tendency to produce a draft in the flue is very much less than in a chimney of equal height. The difference in air pressure induced by the difference in air temperature is so slight that circulation is easily checked if the air passages are small or crooked. To obtain free, abundant circulation it is necessary that the air openings be of liberal size, that the air shafts be straight and direct, and that these shafts extend through the roof to a considerable height above it.

To cool a large mass of warm fruit in a storage house requires the circulation of very large volumes of air. To cool the fruit at all quickly the air must either be very cold or the circulation must be very rapid. Warm fruit in closed boxes or barrels will stand a current of air at freezing temperatures for several hours without

damage by freezing. The cooling of boxed or barreled fruit by a gentle current of moderately cold air is therefore necessarily extremely slow. The temperature of the fruit, even near the outside of the package, changes but slowly. Farther inside the package there may be no appreciable cooling until the outside fruit is materially cooled. Likewise, packages within large compact stacks of fruit will not commence to cool to any extent until the outside packages have been reduced considerably in temperature.

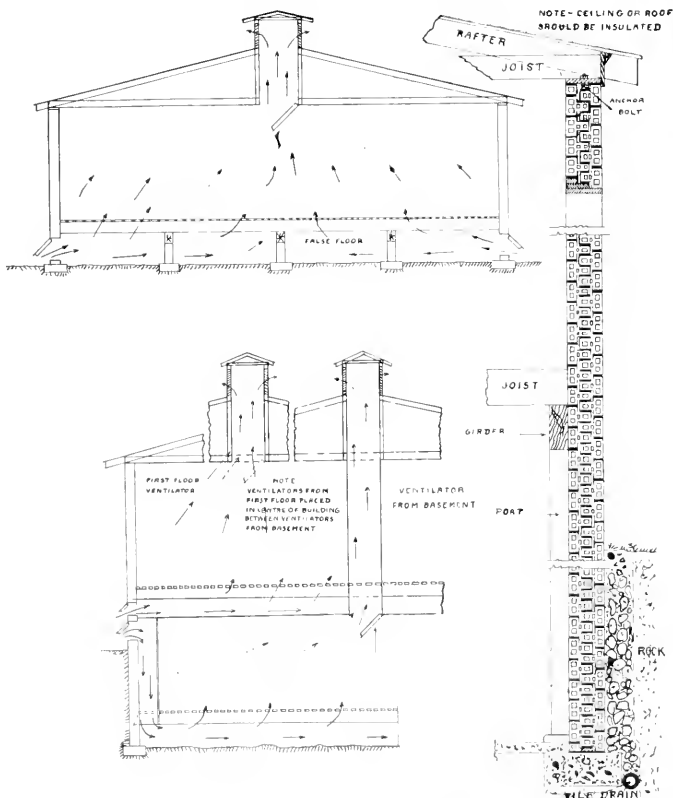
The slowness with which the fruit is cooled, even under the best of conditions, emphasizes strongly the need of both the free and the rapid circulation of cold air. The necessity for free, unobstructed circulation is further increased in the early autumn, when the coolest outdoor temperatures are moderately warm. In order to accomplish any appreciable cooling at such times, large volumes of air must be circulated through the fruit. Quick, prompt cooling may add weeks, even months, to the period during which apples can be held in good condition. The relatively short time during which apples can be kept in good condition in some storage

**BEST SERVICE -
QUALITY & PRICES**

**PERFECTION IN
FRUIT
LABELS**

THE
SIMPSON & DOELLER CO.
1423-24 NORTHWESTERN BANK BLDG.
PORTLAND, OREGON.
E. SHELLEY MORGAN
NORTHWESTERN MANAGER

WE CARRY - AND CAN SHIP IN 24 HOURS - STOCK LABELS FOR PEARS, APPLES, CHERRIES & STRAWBERRIES.



Showing method of ventilating a modern air-cooled storage house built of hollow tile.

Established 1882

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Printers**

WE print anything from the smallest to the largest and always welcome orders of any size or quantity, giving prompt, personal and efficient service. Mail or phone inquiries are solicited. We do not specialize — experience and equipment enable us to print everything equally well. We render service in preparing copy and illustrations and furnish plans and estimates for catalogs, booklets, publications, billboard and any other kind of advertising.

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Portland, Oregon

houses is caused very largely by delayed cooling and by the storage of fruit at temperatures that are too high.

The rate of cooling of fruit in an air temperature of 32° F. is none too fast, especially in the center of a package or in packages within a stack of fruit not properly spaced. It is not uncommon to find overripe, badly decayed apples in the center of a barrel held at regulation cold-storage temperatures. This overripeness is due mainly to the slow cooling of the fruit in the center of the barrel. If overripeness and deterioration caused by slow cooling occur in cold storage houses, it is not to be wondered at that stock frequently shows overripeness and bad condition at the end of only one or two months in common storage.

The difference in the weight of air due to differences of temperature is so slight that natural circulation is, at the best, slow. If, as frequently happens during the autumn or early part of the season, the outside temperature does not go below 45° or 50° F., the rate of cooling will be exceedingly slow. Not only are the lowest temperatures that are possible under such conditions relatively high, but the circulation of the air is correspondingly slow. The amount of heat that slowly circulated air at relatively high temperatures removes from the fruit in a given time is very small. Even with the outside temperatures near freezing, weeks and months may be required to reduce by natural circulation all the fruit in tight containers in large stacks to the desired storage temperature.

To cool the fruit with a reasonable degree of rapidity, the air circulation must be free and abundant. Openings a few inches in diameter are entirely inadequate to provide the necessary air circulation. Few houses have either a sufficient number of openings or openings of sufficient size to be effective. Openings a few inches in diameter, such as are very often provided, may be adequate during the winter after the fruit has been thoroughly cooled and when the outside temperatures are much colder than in early autumn. It is during the first part of the storage season, however, when the coldest outside temperatures are rather high and it is difficult to secure effective cooling, that the critical period, both in the life of the fruit and in the management of the storage house, occurs. The openings, therefore, must be of a size to permit the free, abundant, and rapid circulation of air.

Unfortunately, there are few accurate data on the size and number of ventilators necessary to cool most effectively and quickly a house of a given size with air of a given temperature. The rate of cooling will naturally depend on the outdoor temperature, the size of the house, the quantity of fruit in it, and the temperature of the apples when stored.



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The limited data at hand and practical experience emphasize strongly the need of large openings to effect a free and abundant circulation. The openings for the intake of cold air should be at least 24 by 18 inches. One such opening should be provided for every 10 feet in length, as well as width, on each side and end of the house. These openings should be opposite and so arranged that the alleys or spaces between the stacks of fruit in the storage room will come opposite the openings.

Operation of Ventilators.

As previously explained, the movement of air is brought about by the difference in weight of the warm and the cold air. Whenever, therefore, the interior of the building is warmer than the outside air, the cold air will flow in through the lower ventilators if these are left open. The warmer air in the house passing out through the upper ventilators will be replaced by an equal volume of colder air flowing in through the openings at the base of the building. It is therefore necessary that the temperatures, both inside and outside, be watched carefully and advantage taken of every opportunity to open the house when the air outside is colder than that inside. Air currents through the intake and discharge vents are quickly reversed as soon as the relation of the inside and outside temperatures is change. As soon, therefore, as the air outside becomes warmer than that inside the storage house all ventilators should be tightly closed and kept closed.

During the first part of the packing season it is not an uncommon practice to leave the ventilators open all day as well as all night. This practice is contrary to the very principle of cooling by ventilation. If these openings or ventilators are not closed and opened in conformance with actual inside and outside temperatures, they are of no use, and the fruit might as well, or better, be stored in open warehouses. If the vents are left open during the heat of the day, not only will there be a loss of the beneficial effect of the cooling accomplished at night, but the fruit will lose its keeping quality more rapidly than if held at a uniform, even though somewhat high, temperature.

The most careful attention to the proper closing and opening of ventilators is absolutely essential. No other factor of management is of greater importance in determining the efficiency of an air-cooled storage house. The openings at the end will be of great assistance in facilitating rapid cooling and the maintenance of the desired storage temperatures.

If the house has not been provided with ample intake vents, the basement doors and those nearest the floor level may be left open on cool nights and made to assist greatly in securing low temperatures. Slatted doors, if necessary, can be provided to keep


out intruders and can be so arranged as not to interfere with closing the insulated door; and, as has been noted, this must be done before the temperature of the outside air begins to rise with the heat of the day.

If the house is built with a basement or a half basement, the cooling of this compartment may be greatly facilitated by providing air intakes by means of large tile or cement pipes connecting the bottom of the basement with the lowest near-by outside depression from which water can not be drained into the house. The cold air which naturally collects in the depression will thus be permitted to flow into the storage compartment.

The air shafts for carrying off the warmer air ought to be at least two feet square and should be provided

with a closing damper. One such shaft for every 20 feet in length should be sufficient. These shafts should be straight and should extend as high as practicable above the building.

Where storage houses are entirely above ground or partly below ground, false floors will greatly aid in facilitating the free circulation of air and the rapid cooling of fruit.

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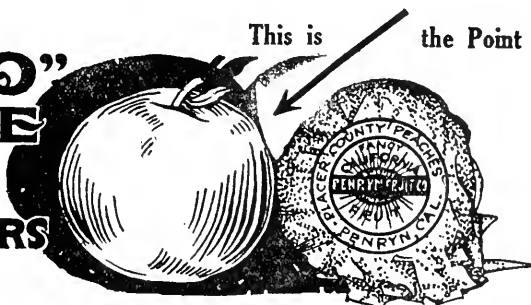
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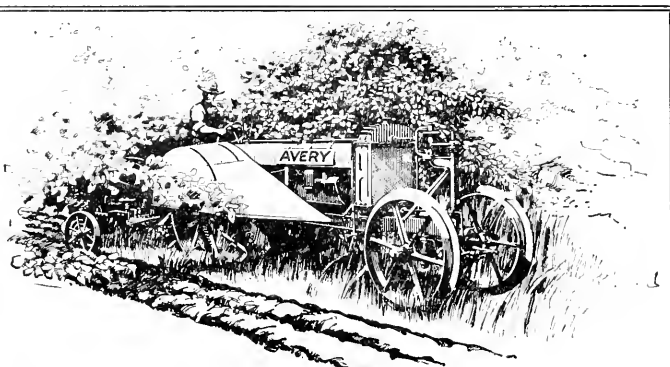
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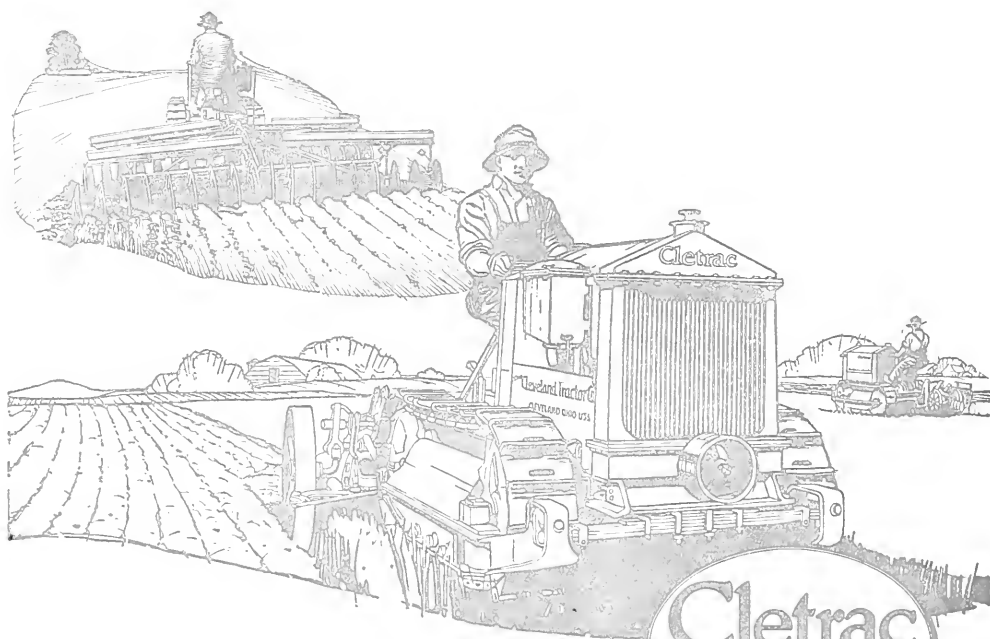
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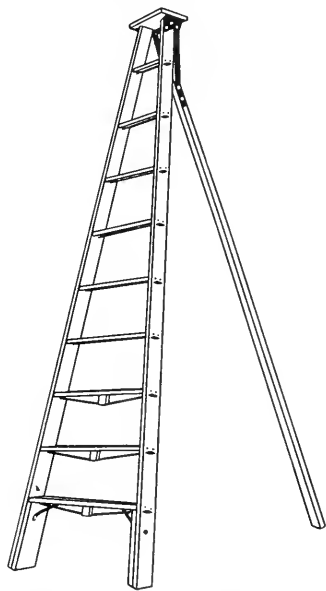
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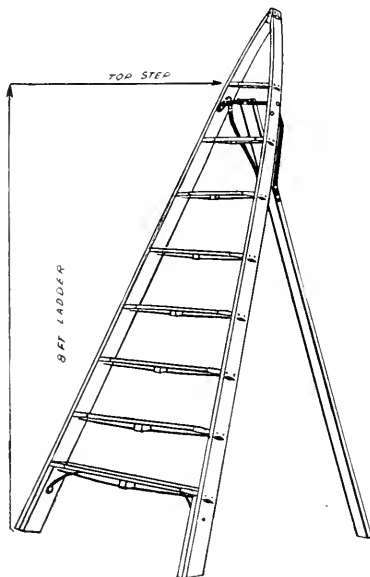
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NUMBER 4

The Propagation of Apple Trees on Their Own Roots

By J. K. Shaw, of the Massachusetts Experiment Station

THE methods of propagation of tree fruits in common use among nurserymen produce trees the trunk and crown of which are of the variety desired, while a part or the whole of the root system is of seedling origin. In many cases roots are thrown out from the base of the scion that are, of course, of the variety of the aerial part of the tree, but it is doubtless true that in most cases, especially with budded trees, the seedling forms the greater part, if not the whole, of the root system. This means that in any orchard of any one variety there is a great deal of variation in the root systems. No two are of identical constitution. This is due to the complexity of the genetic constitution of our cultivated varieties of apples. Seedlings of a single variety, even if from self-fertilized seed, show great variation and many different combinations of characters.

It is reasonable to suppose that these differing seedling roots should cause more or less modification of the top, and there is abundant evidence that this is the case. The most common example is found in dwarf trees. There are many types of the common apple that, when used as stocks, inhibit the growth of the scion, and those that will throw out roots from the stem readily are used as dwarfing stocks. It is well known that dwarf stocks influence also the size, color, quality and season of maturity of the fruit. It is therefore reasonable to believe that many of the individual differences among the trees in an orchard may be due to the varying seedling root systems, and such individual differences, especially in productiveness, are greater than is generally realized. If trees could be propagated on their own roots, or on the roots of a clonal variety known to be well suited to the scion variety, much might be gained in uniformity and fruitfulness in the orchard.

Another advantage in having trees grafted on roots of known varieties lies in the greater resistance to insects and diseases of the roots that can be secured in this way. This idea is in practical use in Australia and South Africa, where the method is used to avoid serious trouble with the root form of the woolly aphid. This insect

was early imported from America, and is there known as the American blight. It was found that Northern Spy roots were highly resistant to this insect, and it is now the usual practice in those countries to propagate all varieties on roots of the Northern Spy, or some other resistant variety.

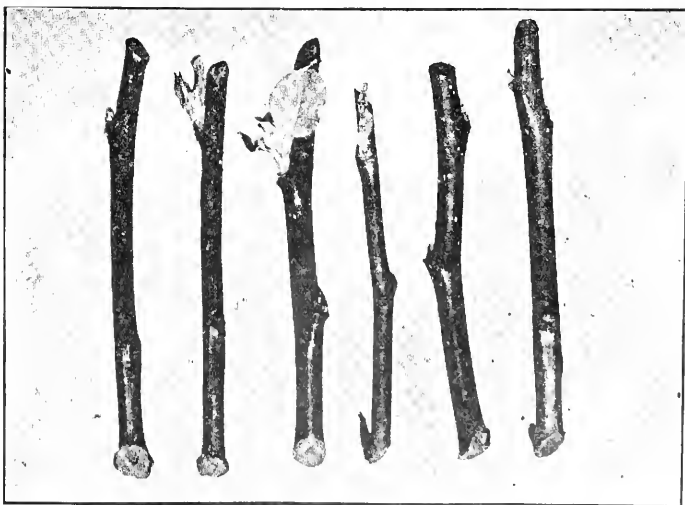
It has been the observation of the writer that roots of different varieties differ in their susceptibility to crown gall, and it is reasonable to suppose that the same may be true with other root diseases. Root troubles are the cause of failure of bearing trees more often than is generally realized. Propagating varieties on known roots offers a chance of overcoming, to a considerable degree, at least, many of these root troubles.

In the northern part of the apple belt, especially in the prairie northwest, resistance of the roots to extreme cold becomes important, and it is considered highly desirable to get varieties on their own roots in order to avoid root killing in winter, when the temperature of the

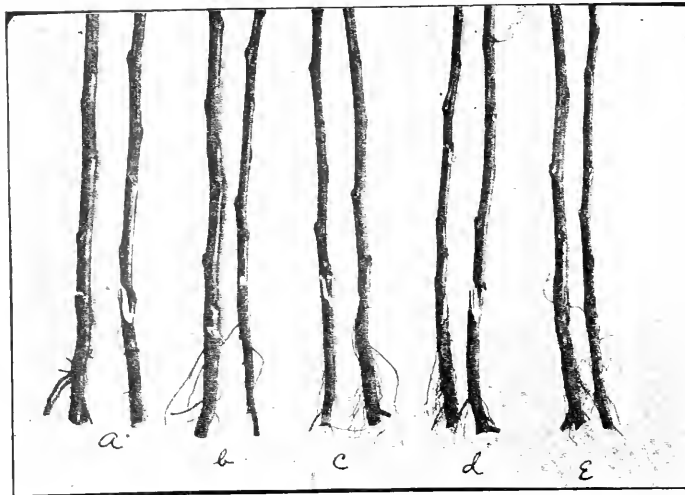
soil falls to an extremely low point. If trees of the varieties suited to these conditions could be worked on roots known to be of extreme hardiness, it would contribute to the longevity and consequent fruitfulness of the orchards.

If we concede that trees growing on roots of known varieties, either as own-rooted trees or trees on roots of other known varieties, may be more desirable for orchard purposes than trees on miscellaneous unknown seedling roots, there are suggested many problems for investigation. For example, what varieties on their own roots are resistant to the various insects and diseases, and what ones possess extreme hardiness to severe cold? What is the effect of different varieties used as root systems on the growth and fruitfulness of the scion variety?

Before these problems can be solved it is necessary to propagate trees on their own roots. The general question of the interrelation of stock and scion is under investigation at this station, and it is the purpose of this paper to



Green wood apple cuttings, showing callus formation. From left to right: Yellow Transparent, Fall Pippin, Red Astrachan, Bough, Ben Davis, Wagener.



Matching cambium in root grafts: (a) One side only; (b) Both sides only; (c) Top only; (d) Bottom only; (e) Perfectly matched.

set forth some of the results obtained in propagating trees on the roots of known varieties.

The first step in securing trees on known roots is to induce the formation of roots from the stem of the chosen variety. The methods most used in practice are by cuttings and by layers. It is known that apple wood roots from cuttings with the greatest difficulty, and that only certain varieties root readily by the somewhat slow and cumbersome method of layers. The method of growing trees on Northern Spy roots to secure resistance to the woolly aphid may be termed the nurse-root method. In this method a rather long scion is grafted by any appropriate method on a short piece of seedling root, and planted out in the usual way. Roots arise from the Spy scion, and the seedling nurse root may be removed, leaving the tree on its own roots.

Propagation By Cuttings

There are few published records of attempts to propagate apple trees by cuttings. Doubtless many have been made and not reported, for the uniform results on record may be described in the single word—failure. Professor F. K. Luke attempted to root apple cuttings of various sizes and lengths at cutting bed temperatures of 64° and 67°. All failed to strike root. Luke was able to induce root cuttings to grow with fairly good success.

Attempts to root apple cuttings were made during the summer of 1912. Green wood cuttings three to four inches long were made in early August and September, and set in sand in the greenhouse. Powdered charcoal was also used as a propagating medium, both alone and as a one-half inch layer over sand, with the hope that it might check disease. Bottom heat in varying degrees was used in some cases, also an enclosed propagating frame. In short, an effort was made to provide the best

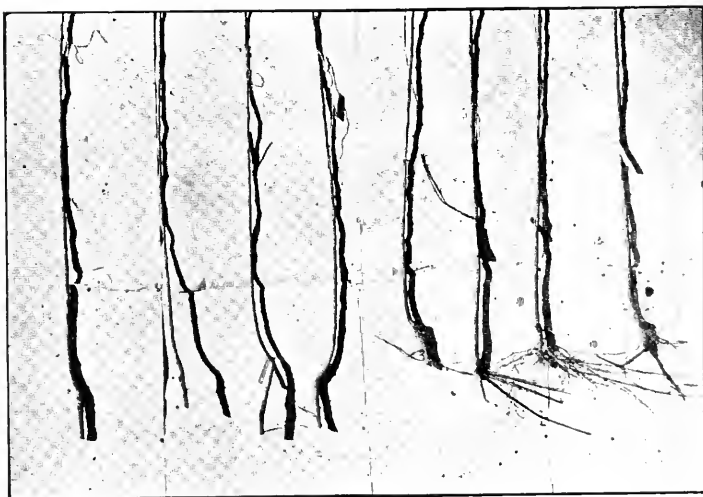
possible conditions for cuttings. Something over a thousand cuttings of several different varieties were made. The results were much the same in all cases. The cuttings formed a callus, varying somewhat with the variety, and the buds started out until the leaves were about one-fourth inch long. This occupied about two weeks, after which growth ceased. The final result was the same in practically all cases. Of the 1,000 or more cuttings only a single one of the Fall Pippin variety rooted, and that only a single short shoot that was broken off in removing from the sand, so that it failed to grow.

In spite of these failures it is the opinion of the writer that it is possible

to grow apple trees from cuttings. To an inquiry addressed to many of the leading nurserymen of the country, thirty-five replied that they had never seen cuttings or prunings from the trees taking root, while seventeen professed to have observed such an occurrence, though none of them considered it at all common. One nurseryman reported having planted well-callused scions in a mixture of sand and soil, and that "the best stand we ever had was something less than 10 per cent of the cuttings planted." The trees were weak for a year or two. The late T. V. Munson of Denison, Texas, says: "I have often had apple and even peach switches cut from the trees in February and stuck into the ground (very sandy) for label sticks, take root and grow off well."

In the spring of 1913 a considerable number of root cuttings from young trees were planted in the nursery row. No record was kept of them, but they made a good stand though growth was very slow the first season. It is the practice of at least one nursery firm to dig trees already established on their own roots once in two years and cut off the roots for propagation by root cuttings. The trees are then replanted and a new crop of roots grown.

In a later experience of the writer, root cuttings from the root system of bearing trees were used in an attempt to propagate the stock variety. This resulted in almost a complete failure. The roots used were from one-quarter to one-half inch in diameter, and when planted in the open, about three inches long. Others planted in the greenhouse were about one and one-half inches long. Whether older roots propagate with greater difficulty, or whether some unfavorable conditions not readily seen interfered with success, cannot be told with certainty.



Trees rooted from the seedling scion after cutting off seedling nurse roots; two-year-old trees cut back in spring of second year. Tolman at left, Bough at right, showing stronger roots of latter.

Propagation By Layers

The method commonly used in propagating dwarf trees is by some form of layerage. A considerable number of attempts were made to induce root formation by air layerage. Earthen pots were split, and in early August were placed in appropriate position on growing shoots and filled with sphagnum moss. They were kept moist by frequent watering. None of these air layers showed root formation. It proved difficult with the rather small pots used to maintain uniform moisture conditions, and this may have had something to do with the failure.

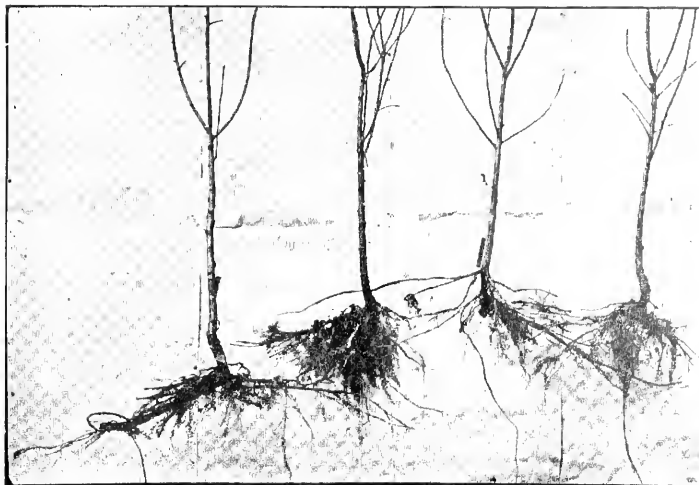
In the spring of 1917 two-year-old trees growing in the nursery row were cut off three or four inches above the ground and allowed to stool. Later in the summer soil was heaped up around the new shoots to the height of four or five inches. The varieties used were Ben Davis, Bough, Rhode Island Greening and Transcendent. None of these shoots have been separated in an attempt to establish them as independent trees, but investigation in the spring of 1919 showed that most shoots of all these varieties bore small roots, coming out near the junction with the cut-off stump.

Propagation By the Nurse-Root Method

It is well known to most nurserymen that root-grafted trees often send out roots from the scion, and may eventually become established, partially, at least, on their own roots. In an attempt to collect information a questionnaire was sent to the leading nurserymen. About 75 replies were received, and most of these show care and thought in answering the questions. They were suggestive at the outset of this work, and are interesting to review after eight years' work on the problem. The first question was, "Have you ever observed root-grafted apple trees rooting from the scion?" Fifty replies say yes, and six reply no. Especially in the Middle West nurserymen regard it as a common or usual thing, while in the East, South and on the Pacific Coast it seems rather less well known. It may be that rooting is more frequent in the rich, loamy soil of the Middle West, or it may be that it is because the practice of root grafting prevails there more than in the eastern and other nursery regions.

The second question asked, "In what varieties, and in about what proportion of the trees," rooting from the scion had been observed to occur. The general trend of the replies was that all varieties might do so, Winesap being the only sort mentioned as not rooting. Generally the varieties mentioned were those most extensively grown. Ideas as to proportion of trees rooting were diverse, some saying a small percentage and others nearly all.

A question as to the most favorable conditions for rooting brought in nearly every case, when a positive reply was made, the suggestion of the long-scion, short-root graft; deep planting was often suggested; abundant fertility and plenty of moisture were often mentioned; where soil prefer-



Own rooted Red Astrachan two years after cutting of seedling roots.

ence was expressed it was for a sandy or loamy soil.

Methods Used

The first lot of grafts for the purpose of securing trees on known roots were made in 1912, and others were made during subsequent years, including 1917. The method has been to make an ordinary piece root, whip graft, using a straight root two to three inches long, and a scion six to eight inches long. The grafts have been made at various times in the late winter and early spring, most of them in February or early March. For the most part they have been made by student amateurs, and yet they have been as well made as the average of commercial work. It has appeared that there is more dependent on the way the scions were handled before and after grafting than in the skill with which the union was made. To test the necessity for large contact of the cambium layers five different methods or degrees of matching were tested, as follows:

- (a) Matched on one side only, not at top or bottom.
- (b) Matched on both sides, not at top or bottom.
- (c) Matched at top, not at sides or bottom.
- (d) Matched at bottom, not at sides or top.
- (e) Perfectly matched all around.

The variety used was Baldwin. Where it was desired to avoid matching, the scion or root was cut away, if necessary, to make a space of at least one millimeter. The grafts were then planted and cared for in the usual way.

Discussion of the Results

As a major result of the work two facts are brought out: (1) varieties differ greatly in their readiness to form roots from the scion when propagated by the nurse-root method; (2) there is also great variation within the variety

in the number that form roots from the scion.

Taking up first the varietal differences we find that a few varieties root in all, or nearly all, cases, while only one variety of *Pyrus malus*—Bethel—has failed entirely to yield trees rooted from the scion. Inasmuch as this variety was grown in rather small numbers and under conditions where other varieties gave low percentages of rooting trees, it is probable that Bethel would, under more favorable conditions, give at least a low percentage of rooted trees. Considering the number of varieties tested it seems safe to say that any variety of the common apple may be propagated on its own roots by the nurse-root method.

There are fourteen varieties that have been propagated in considerable numbers in successive years and under different conditions, so that we may feel fairly certain that the percentage rooting is fairly representative for these varieties under the general conditions in which they have grown. Arranged in order of percentage rooting they are as follows:

Bough (Sweet).....	98
Red Astrachan.....	67
Northern Spy.....	58
Ben Davis.....	51
Wagner.....	45
Transcendent.....	45
Baldwin.....	32
Rhode Island Greening.....	30
Oldenburg.....	26
Yellow Transparent.....	26
Wealthy.....	25
Hubbardston.....	21
Jewett.....	20
Tolman.....	3

Coming now to the question of why certain of these varieties root better than others we find a rather difficult problem. We have made few investigations aimed directly at this question, but some discussions may be ventured.

The property of rooting is not directly correlated with vigor. Tolman is fully as strong growing a variety in

Continued on page 31.

The Evolution of Box Apple Packing in the Northwest

By Walter L. Mason, of Hood River, Oregon

THE evolution of the packing table from the old familiar gunny sack covered table to the present highly efficient power grader, reads almost like a romance. One's memory does not have to go back very far to recall the days when the old farm hack and other farm paraphernalia were ejected from the barn to make room for the packing table and the many stacks of boxes, each stack representing a different grade, and possibly two different sizes of sorted fruit.

This transformation has been achieved through necessity—the necessity of greater economy in time and labor. The young orchards of ten years ago have now come into full bearing, and to handle the greatly increased production it has become necessary to discard the old packing methods and employ new ones.

In order that we may visualize the transformation, let us briefly survey the packing house operations for the past ten years. It must be realized that no two growers handle their fruit in the same manner, but the following description, the writer believes to be fairly representative of the methods pursued by the majority of growers.

As this article will only treat with the packing end of the apple harvest we will follow the fruit from the time it enters the apple house or barn until it is ready for shipment. In 1910 the fruit on arrival at the packing house from the orchard, was stacked in boxes from six to nine boxes high, each variety being segregated as far as the usually limited storage space permitted. The fruit was next sorted, and everything made ready for the actual packing operation. The sorting of the fruit was undoubtedly the most tedious and expensive of all the various packing house operations.

A long narrow table, varying in length from five to ten or twelve feet, and some forty inches in width, was used for this purpose. A box of unsorted fruit was placed in front of the sorter, who not only had to determine the grade or quality of the apple, and in some varieties, this meant five separate grades, but also the dividing point between large and small apples. Ranged along the table, and within reaching distance of the sorter, were placed empty boxes into which he placed the sorted fruit. When a box was filled it was placed in a stack representing a special grade or size of fruit. The sorting operation usually continued until the floor space was entirely congested, if the grower was fortunate enough to possess sufficient floor space, the sorting and packing operation were both carried on at the same time. The usual practice, however, was to sort a quantity of fruit, pack it out, and to repeat this process until the entire crop was packed out.

From the stack of sorted fruit the

apples were dumped (and I use this term advisably) on a burlap-covered frame about the height of an ordinary table. The more fruit that was piled on the table the better the packer liked it, as it gave him a greater selection—this piling of the table, of course, resulted in much bruised fruit as often the apples which were first poured on the table remained there for many subsequent pourings. To add to the packer's trouble, several sizes of apples were packed in what was called a "California box." The cubic contents of this box was the same as our present standard box. Why and when it was introduced the writer does not know. That it was finally discarded is something for which the growers are very grateful. As from 5 to 10 different sizes of apples were piled upon the same table at the same time, it often meant that a packer would be compelled to set aside a partially packed box and start on a different sized pack, returning to the first pack only after a sufficient number of apples of corresponding size to his first pack were uncovered, or additional fruit was dumped on the table. It was not at all uncommon to find a packer with 5 or 6 partially completed boxes piled indiscriminately around the table. This, of course, greatly hindered the packer and frequently induced him to top out a box with off-size apples rather than set the box aside when near completion. It was an exceptional packer who could turn out 100 packed boxes a day under this old system, from 60 to 75 boxes per day was the average pack. The box, when completed, was carried from the packing table to the box press, where the tops were clamped down and nailed, the box stamped and slacked for shipment. This roughly was the packing house procedure in 1910. It was not long, however, before increased production demanded more efficient methods, and in the next five years there appeared on the market various combinations of sorting and packing tables, which greatly relieved the old congested packing house conditions, and also helped to reduce the packing cost. The new and outstanding feature of these tables was the combination of sorting and packing facilities. In general they were comprised of a series of packing bins so arranged that each bin was within easy reaching distance of the sorter. One type of table resembled a three-quarter section of a wheel, the sorter stationed at the hub and placing the sorted fruit according to size and grade in bins formed by the rim and the spokes of the wheel. In another type the bins, some 6 or 8 in number, were arranged back to back with a separate gravity canvas chute leading to each bin from the sorting table. In this way a sorter could grade his fruit from a small canvas covered table.

Even under this method it was usually necessary to sort one grade into boxes and pack them out separately later on, as only two grades could be conveniently sorted into the bins and afford any real discrimination in size. About this time, 1915, the first really efficient power graders appeared, and from that date to the present time many have called but few have been chosen. We will, therefore, pass over the discarded and briefly note the outstanding features which are common to most of the present-day power graders.

The power grader of to-day consists of from 10 to 20 bins, according to the number and grades and sizes required, arranged back to back in two equal rows.

On the smaller graders of eight to twelve bins, the bins on one side of the table represent one grade, those on the other side a second grade. On the large machine a number of the end bins are used for a third grade and are fed by a separate conveyor. Apples which fall into the cull class are either carried on over the end of the table by a conveyor and dumped into a box or are deflected by the sorter when they appear on the sorting table.

An endless belt chain or slat conveyor passes over and between these two rows of bins, conveying the apples from the sorting table. The apples on the conveyor are deposited in the different bins, according to size, by either a deflecting belt, counter weight and spring, or some other mechanical device, and these devices have been so perfected in the past two or three years that the uniformity in the size of apples in a single bin is phenomenal.

The sorting table is so arranged that the apples pass in front of the sorter on a belt conveyor and are transferred by the sorter, according to grade, to the different conveyor belts, which pass in front of him. A movable frame on which the packer places his box is attached to the side of the grader, thus permitting the packer to pass from one bin to another on completion of the box.

In most up-to-date packing houses the boxes are conveyed from the grader to the box press on a gravity conveyor, and from the press to a storage stack in like manner. Whereas the development of the box press has not been as revolutionary as the packing table, nevertheless there has been a number of notable improvements to the crude press of ten years ago. Formerly the placing of the tops and cleats and nailing them down was an arduous and slow process. To-day it is done very quickly and with some processes the boxes are stamped at the same operation.

The next ten years will probably

witness many changes in our packing house methods, although it is doubted if they will revolutionize this department of the apple harvest as have the

changes of the past ten years. Probably the changes will chiefly consist in a perfection of our present equipments and methods.

department is one of the largest in the Northwest and the association is able to direct the planting of vegetable and bush fruits so as to have a continuous supply. There is some product canned or dried each month in the year. This makes business for the association so it can maintain its force of labor throughout the year. The vinegar department makes from 25,000 to 30,000 gallons of vinegar each season. There is practically no waste. Whatever the grower has to offer is taken, if the manager feels certain it will sell for enough to pay cost of manufacturing into a salable article.

The fruit remains the property of the grower. When the commodity is sold, the cost of manufacture and sale is deducted and the growers gets the rest. The association carries out a system of financing the growers when in need of money for growing and harvesting their crops. In turn, the association at times, borrows considerable amounts from the grower stockholders. This plan is quite unique and most serviceable to both the stockholders and to the association.

It takes a good manager with a good business head to make this scheme both sound and serviceable to both parties. Mr. J. O. Holt, the secretary-manager, is peculiarly fitted for this position. The writer does not know what salary he receives. Whatever it is, he is competent and earns every dollar he draws. This illustrates why this co-operative plant succeeds. It is due to its sound business policy, its universal support in its district and its efficient business manager. Otherwise it would not have its full 12 years of successful operation when so very many of the co-operative fruit associations in the Intermountain region, founded upon a similar plan, have gone to the wall. One thing more permit us to say, about one division of this association's work. The evaporator run by this association at Eugene City, is reported to be the largest in Oregon. It has 49 tunnels, holding about 4,500 trays, and its capacity is 1,000 bushels per day. It was built for evaporating prunes, but it is also used, in July, for loganberries, and late in the fall, for apples and walnuts. The spray plant of the association furnishes the lime, sulphur and other spray material, already mixed and ready for use. It is furnished to association members, at cost to the plant. Seeds, tools, fertilizer and boxes are likewise furnished at cost.

Dehydration Plants of the Northwest.

The writer found in the Northwest three different concerns, each claiming a superior process for abstracting all but a minimum amount of water from fruits and vegetables without breaking down the cellular structure of the treated product.

Mr. A. F. Spawm claims to have been the first man to conceive of a commercial plan for taking water out of fruits and vegetables in this careful

Continued on page 33.

Utilizing the Fruit Crop of the Northwest

By W. H. Olin, Agriculturist Denver & Rio Grande R. R., Denver, Colorado



W. H. OLIN

THE Northwest, including Washington, Oregon, Idaho and the Bitter Root Valley, Montana, has developed into our Nation's best fruit basket. Here fruit is graded to a nicety for color, size and quality. When a grower gets into the Skookum class he knows he is at the head, for it is one of the highest grade apples grown in the U. S. A. When his butters, jellies and jams are incorporated in Farmer Paul's large and growing family of these delectables, he knows he has reached the present acme of quality. Now comes Mr. Calkins, of Hood River, with a scheme of furnishing fresh cider ad libitum to any consumer without violating any state or national law on beverages. Mr. C. J. Calkins has developed a process of condensing cider to a syrup without giving it a cooked flavor and this cider syrup can be put into barrels, kegs, tins or bottles as the trade may desire. It will, in the syrup stage keep an indeterminate length of time.

The work of Mr. Paulhamus at Puyallup, Washington, with bush fruits, whereby not only the berry crop is conserved, but such a quantity of butters, jellies and jams come to market, it is said that this valley has an annual income surpassing that received by any other valley of similar size in the United States.

Friends let us have a first hand conference with our standing organizations and plants not well understood or known. So that your readers can check up on me, Mr. Editor, we shall give names and locations.

Let us first begin with the work Professor C. I. Lewis is now doing. As professor of horticulture, at Oregon Agricultural college, he did a very strong work. As associate editor of Better Fruit and the American Fruit Grower, Prof. Lewis has been read widely. But the greatest work this man has done he is now doing. He is organization manager of the Oregon Growers' Co-operative Association. His plan is to organize Oregon fruit growers to not only sell their fresh fruits co-operatively, but also to can, to evaporate and to otherwise conserve the by-products of the fruit and vegetable business. August 1, 1919, this Oregon Growers' Co-operative Association was started with 134 members controlling the output of 3,000 acres. September 1, 1920, the association had 1,500 members with 28,000 acres signed up. There are now ten packing plants in as many

different communities. These are standardized plants all using the same machinery. The advantage of this is apparent. Ninety-five per cent of the green fruit sold represents a community pack. The present cost to the grower for this centralized pack is 1c per box. A careful, uniform inspection system is maintained. For each type of fruit, there is one uniform grade, pack and container. This tends to make trade calls stable. This association plan of work is on the basis of helpful counsel in selection of farm fruit plans, to anticipate a one fruit plan in any one section and such a distribution over the territory, as shall give a bush and tree fruit, well adapted to each district; selection of the type that more nearly meets market demands and does best in a given region.

The association also renders helpful suggestions in cultural methods, helps assemble harvest help and after harvest, directs the product to market. It takes more than one swallow to make a summer. We must give the Oregon Growers' Co-operative Association a chance to prove their efficiency. Let us go to the oldest association now going in the Northwest.

A Co-operative Association That Spells Success.

"Olin," said Prof. Lewis, you can not afford to leave the Northwest without visiting the Eugene Fruit Growers' Association. There is the most complete plant in this whole Northwest region."

We found it even so. This association was organized in January, 1908, with 94 stockholders and \$5,000 capital stock. Today it has 685 stockholders and a paid-up capital stock of \$72,160. It has had a continuous existence, a definite plan and purpose from the beginning. This association handles as large a percentage of the fruit in the fresh state as possible for its stockholders.

To protect its stockholders on containers, this plan has a box factory. In 1919 this department cut approximately one and one-third million board feet of lumber into boxes. The green fruit department sent out 32,944 boxes of apples and pears. The ice and cold storage department not only furnishes ice and storage for the fruit products but supplies Eugene city with its ice supply. The canning department of the association put up 80,000 cases of canned goods last year. All vegetables suitable for canning as well as fruits are utilized. This department is of vital importance to truck and bush fruit farmers of this district, encouraging diversified fruit and vegetable farming. The drying

Notable Cherry Crop Production



A 14-inch spray of Lambert cherries that weighed 3 pounds. Grown near Salem, Oregon.

A notable cherry crop production this year was taken from the seven-acre orchard of Lambert trees owned by O. E. Brooks, near Salem, Oregon. The orchard, which contains 600 trees, was planted eleven years ago. In 1918 this orchard yielded 13 tons of fruit. The 1919 yield was 11 tons, while this year the yield is said to have been near the 40-ton mark.

The soil on which it is located is the typical red hill soil of the Salem district, and, according to S. H. Van Trump, county fruit inspector, appears to be at the proper elevation for maximum production. The spray of cherries shown in the accompanying picture, which was typical of many in the orchard, measured 14 inches and weighed three pounds.

With the exception of two years ago, when Mr. Brooks lost a portion of his crop by the cherry maggot, the orchard has been a big producer. By spraying at the proper season now he has been able to control the maggot thoroughly.

Allowing Apple Orchards to Overbear

BELOW will be found an illustration of an abundant yield of apples. To the uninformed observer a yield of this kind no doubt causes amazement and visions of a fortune in the orchard business. Or to the orchardist, who is willing to disregard the future welfare of his trees for the profits of the present, a glance at this picture will probably cause delight.

tality necessary to make the proper wood growth and to develop into a sturdy and long-lived even-bearing orchards.

Condition your orchard by pruning and thinning, to bear a normal rather than an abnormal yield of fruit and you will avoid many of the ills that come from devitalized trees, small fruit as the orchard grows older, and a tendency toward off-bearing years.



A soft spot for the fruit picker, but not good orchard practice.

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WHEN WRITING ADVERTISERS MENTION BETTER FRUIT

The fact is, however, that fully one-half of the apples here shown should have been thinned out, notwithstanding the fact that they are of large size and well developed, for no orchard allowed to continue to bear in this way will survive the test of time. The trees will be robbed of the vi-

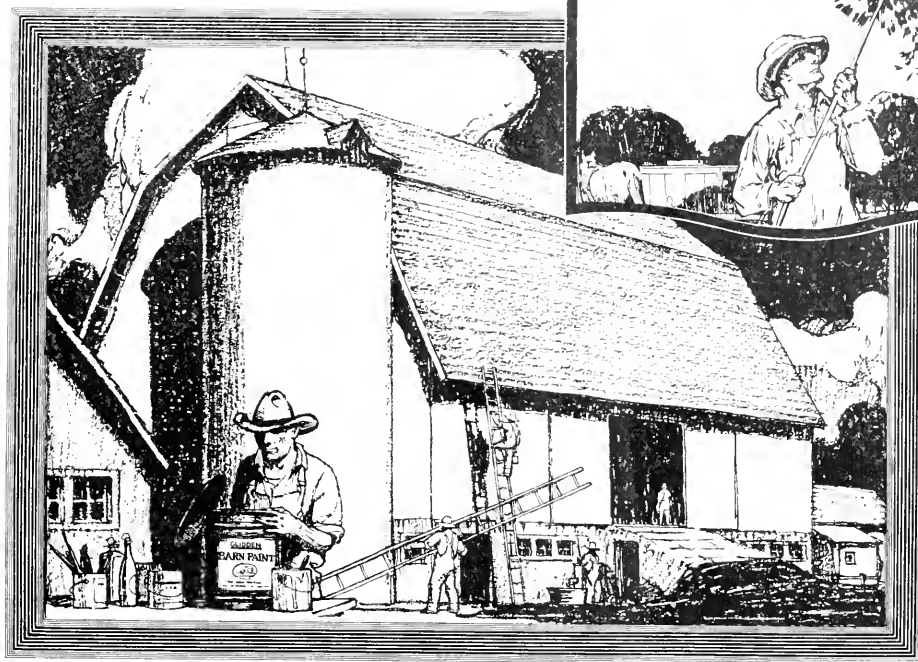
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PAINTS ~ VARNISHES ~ COLORS ~ INSECTICIDES

Red Spider in Prune Orchards and Methods of Control

By W. H. Wicks, Director of Plant Industry, Idaho State Department of Agriculture

THE attention of fruit growers is again called to the fact that there are two species of Red Spider, common throughout the state, which are found in more or less numbers on various kinds of fruit trees, small fruit, gardens, and other forms of vegetation. Some prune orchards in southern Idaho are at present being severely damaged. The species which is doing the most damage is the true Red Spider (*Tetranychus bimaculatus*) and the other species commonly found is known as the Brown, or clover, Mite (*Bryobia pratensis*). The Red Spider spins a web and winters as an adult, while the Brown Mite does not spin a web and winters in the egg stage.

Some prune orchards in the Payette district are so severely damaged at the present time by the Red Spider that practically all the leaves and fruit have fallen, causing an entire loss of this year's crop. This condition also devitalizes the tree for the future. There are all degrees of injury apparent from an occasional limb, just beginning to show, to an occasional tree seriously affected in an orchard otherwise in full vigor. In some orchards only one or two rows are decidedly discolored and showing the gradual spread of the damage. Many orchards are showing no apparent damage.

At Lewiston last year, apple orchards were injured by the mites and apple growers as well as prune growers should be constantly on the watch for the presence of these pests and control them by spraying before the damage is done.

Nature of Injury.

The first symptom, usually, of the presence of the Red Spider in an orchard is the discoloration of the foliage, which loses its vigorous, healthy, green color and begins to turn a light dusty to brown color. In many cases the leaves begin to curl, but often curling leaves on individual limbs, or the entire tree, curl from other causes. Upon close examination, preferably with a magnifying glass, small, finely spun webs are readily detected which are present on the foliage and twigs and collect dust which soon causes the tree to appear heavily covered with road dust. In these webs the Red Spider exists, but does not confine itself to the protection of the web constantly, as it works about freely over the fruit, foliage and branches in feeding. Its effect on the foliage is such as to completely defoliate a prune tree during one season and causes the prunes to shrivel, loosen from the stem and drop to the ground.

Due to the fact that these mites develop rapidly and do serious damage to the prune and apple orchards when conditions are favorable, the fruit

growers should prepare to control them during the summer when the mites appear and before damage is done.

When to Apply Spray.

Tests made by growers of the Payette district, State Experiment Station and State Department of Agriculture show for this year that these insects have been controlled by applying the spray as late as August 5th, but the best way to be sure of the correct time is to examine the orchard at least twice a week for the presence of the insects and apply the spray before they have an opportunity to cause damage to the trees and fruit. A spray applied this season from June 15th to July 15th, and even as late as the first week in August, would have given sufficient control of the Red Spider in those orchards which are now suffering severely. It is highly important that growers acquaint themselves with this insect and plan to combat it whenever its ravages are apparent.

Spray Material.

Efficient control of the Red Spider can be secured by the use of one of the following solutions, if applied at the right time and used thoroughly:

Lime sulphur, 33° Baume.....	6 gallons
Flour, made into paste.....	8 pounds
Water	104 gallons
or	
Powdered sulphur	40 pounds
Soap	5 pounds
Water	200 gallons
or	
Lime sulphur, 30° Baume.....	4½ gallons
Water	200 gallons

The first formula has given success in California and other states, and Mr. Longley, Idaho Experiment Sta-

tion, found the second formula efficient. The last formula has been used successfully by some growers in the Payette section.

Other Injuries.

In ascertaining the presence and damage of the Red Spider, growers should bear in mind various other blemishes and defects of the fruit and tree which are not caused by these mites. The blue, waterlogged areas of the prune, the issuing of gum, and the brown tissue in the flesh, which is commonly noticed in the prune, is due to a temperature and moisture factor and is associated closely with the vitality and vigor of the tree.

Devitalized trees may be often due to a number of cultural and environmental factors and any cause which will devitalize trees must be ascertained and corrected insofar as possible by the grower. In the matter of damage by unusual temperatures the grower is usually helpless, but problems of the soil, fertility, irrigation, cultivation, insect and disease control, and pruning are controllable factors.

Number of Trees Per Acre.

There are 43,560 square feet in an acre of ground. If the trees are set square and planted 20 feet apart there will be 108 trees to the acre. If 30 feet apart, 48 trees to the acre; 40 feet apart, 27 trees to the acre, and when 50 feet apart, which is the usual planting for walnuts, there will be 17 trees to the acre.

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United States Government Bureau of Standards

(Ask for copy of report of test)

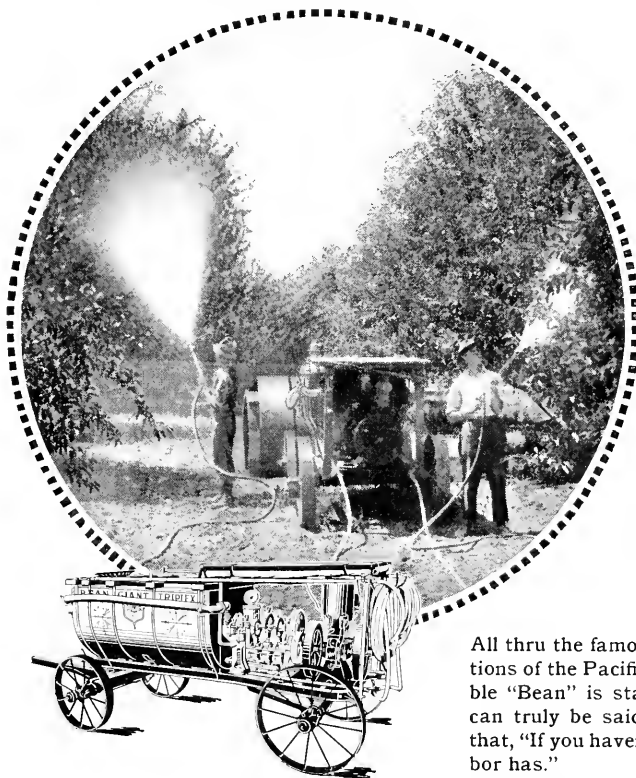
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All thru the famous apple-growing sections of the Pacific Northwest, the reliable “Bean” is standard equipment. It can truly be said of this entire region that, “If you haven’t a Bean, your neighbor has.”

The “Bean” is the choice of the Northwest grower, because he has long since learned the value of—

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- absolute dependability at all times

Two Factories
promptly
serving
the East
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Send the Coupon

Get the new Bean catalog, which illustrates and describes the entire Bean line, including the Bean Super-Giant.

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SPRAYERS

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BEAN SPRAY PUMP CO.
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118 W. Julian St., San Jose, Cal. (Mail to address nearest you.)
Name _____
Street _____
Town _____
State _____
Kind of Fruit Grown _____
No. of Acres _____

Timely Notes on Oregon Nut Growing

By Knights Pearcy, Salem, Oregon

THE interest in filbert planting continues to increase in Oregon. Plantings are going in as rapidly as nursery stock can be had, in spite of the extreme prices asked for the trees, which run as high as 65c, 85c and \$1.15 each for Barcelona, DuChilly and Daviana, respectively. One grower alone planted 3000 trees in the fall of 1919.

The writer, in company with Murray Wade, editor of the Oregon Magazine, recently made a visit to the grove of the veteran grower, George Dorris, of Springfield. Dorris has the oldest commercial planting of filberts in the Northwest, having some 1200 trees ranging in age from fifteen years downward. His grove is planted in a wonderful type of river bottom soil, fertile and retentive of moisture.

Dorris figures that his crop is about normal in size, which means that the nuts are hanging on the trees very much like hops on the hop vines. He expected his harvest to commence about the 20th of September.

The Oregon Agricultural College is doing some very interesting experimental work in the Dorris plantings. It has been well known among the growers for several years that certain of our varieties of filberts are self sterile, that they will not set fruit when pollinized with their own pollen. It has also been demonstrated

that while certain varieties appear to cause another variety to set a crop, certain others have no effect in that direction. These observations have been made in the field altogether and heretofore no well controlled and well planned work has been done to find which of the varieties are self fertile and which are self sterile and to determine which of the varieties are effective in causing a set of fruit on the various self-sterile varieties.

Field observation, for instance, has shown that DuChilly has a beneficial effect upon Barcelona and that Daviana is of great value in pollinizing DuChilly, but that Daviana is nearly self sterile and, to date, no variety has been found that will cause it to bear commercially. This variety produces one of the most beautiful nuts of any of the filberts, and it is to be hoped that Prof. Schuster, of the college, will find some variety while conducting his many pollinization experiments that will pollinize this variety.

While field observations are by no means as accurate as controlled pollinization work, still they have their value, especially in a field so lacking in scientific investigation. The Dorris planting is scattered about a 200-acre farm, in small fields, with heavy timber lying between the fields. One planting in which filberts are used as fillers in a walnut grove, is planted to

Barcelona filberts about 11 or 12 years old. In this field are two or three White Avelines. The White Avelines never bear a crop worth harvesting, indicating that Barcelona has little or no pollinizing effect upon that variety. The Barcelona trees closest to the Aveline are bearing a fairly good crop, while the farther away from the latter variety one goes among the Barcelonas the smaller the crop until at some distance there is little more than enough crop to serve to identify the variety. Dorris reports that this has always been the case. This would serve to indicate that Barcelona is partially self-sterile, at least, although many other growers feel that it is more or less self-fertile. These apparently contradictory observations regarding the fertility of Barcelona may be due to the fact that we are applying the name Barcelona to a type of nut rather than to a variety, and careful study of the nuts produced in the various plantings may demonstrate that our growers are including a number of different varieties under the name of Barcelona. The same may be true of others of our so-called varieties. There is bound to be confusion in the nomenclature of any new species of fruit when first introduced into a district, as is the case of the filbert in the Northwest.

Dorris has made some interesting observations regarding the Bud-Mite. He finds that his Barcelona is not affected by it, while the Daviana is af-

Continued on page 24.



GMC Trucks

Orchardists—

W. F. Richardson of Yakima

Says:

"Up until last week I thought I knew something about the values of motor trucks. Since I saw your GMC 16 operating a Bean spray pump outfit with capacity load I have entirely changed my ideas of truck efficiency on the farm.

"If any one had told me that I could use a truck in my orchards under all conditions, and that the truck engine would not only operate the truck, but also the pump, I would have been skeptical. Having put on 9 tanks of spray in an afternoon while my best teams were putting on 4 tanks, my hat is off to the GMC.

"I really think that you have solved the question of a truck for the fruit growers. I have thought a good deal about it, but I cannot find a single fault with your outfit."

Seattle
Spokane

ELDRIDGE  **SALES CO.**

GMC ON A TRUCK IS LIKE USA ON A BOND

Yakima
Walla Walla



*A Vision
forty seven
years ago -
A reality
today.*

*Built upon
the principle
"He profits most
who serves best"*

*Schmidt
Lithograph Co.*

*Seattle Sacramento
Portland Fresno
Los Angeles Honolulu
San Francisco.*

Schmidt
LITHO.
CO.

Scandinavia a Market for Northwest Apples

SCANDINAVIA offers a good although limited market for American apples and prospects for a successful year in this trade are encouraging, according to the Fruit Trade Commissioner of the Canadian Department of Trade and Commerce.

Great Britain, the United States Holland, Switzerland and Canada are the chief sources of the apple supply of Scandinavia. Practically all of the imports from Great Britain, however, must be credited to apples from trans-Atlantic sources, re-exported. The apples received from Germany also include large quantities of re-exports from Hamburg. It is evident, therefore, says the Market Reporter, that American apples comprise a large part of the Scandinavian apple imports.

Owing to the fact that the prices of trans-Atlantic apples in Sweden are too high for ordinary consumption until the cheaper varieties are exhausted, home-grown and Dutch apples hold the market there until after Christmas. Holland and Switzerland have been the chief sources of Sweden's apple supply since 1917, because war conditions curtailed trans-Atlantic shipping. Since the Dutch apple crop is a complete failure this year, the demand should be satisfactory for American apples, both in boxes and in barrels.

As a rule there is only a light demand for imported apples in Denmark before the middle of December, on account of home and Dutch supplies. Owing to the failure of the Dutch crop, however, American apples in all probability will find an early market there this year.

In Norway, the home grown European imports supply the market until November, after which date trans-Atlantic shipments are in demand. The main season for shipping American apples to Norway is from December to March.

Throughout Norway the red varieties command the best prices, Baldwins, Kings, and Ben Davis packed in barrels being special favorites. Practically no demand exists for green or cooking apples. In the box packs, the varieties especially desired are Jonathans, Spitzenbergs, Winesaps and Arkansas Blacks. Rome Beautys are good sellers but are less popular than more highly colored varieties. The Yellow Newtown is not appreciated except when red varieties are unavailable.

The preferences in Sweden are practically the same as those in Norway. Late red apples are especially liked, but there is no demand for yellow or green varieties. The Yellow Newtown, however, is more popular than the Norway.

In Denmark also red apples are preferred, although western Newtowns are in demand. Boxed varieties may be placed in the following order of popularity in Denmark: Delicious and Newtowns; Winesaps; Jonathans, Spitzenbergs, and King Davids; Rome

Beautys and Arkansas Blacks. In addition to red barrel varieties, Golden Pussnets are appreciated.

A strong preference exists throughout Scandinavia for the western box pack. As business is transacted on a cash basis, it has been found more economical to deal in box apples than in barrel apples, and for this reason it is difficult to interest the trade in the direct handling of the latter.

The preference for box-packed apples is due not only to the fact that they are usually of a superior standard but also to the fact that they may be shipped more safely. They are also more likely to arrive in a satisfactory condition and are better adapted to handling and inland transportation when packed in boxes.

The preferred sizes of box apples in

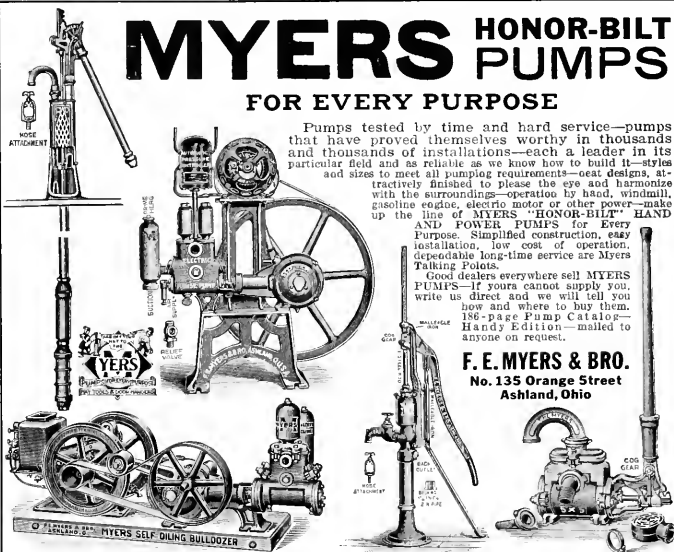
Norway are from 150 to 175 to the standard western box, but there is a good demand for sizes ranging from 188 to 225. Only a small percentage of sizes 125 to 138 can be disposed of, while sizes larger than 125 are difficult to sell.

Although medium-sized box apples are preferred in Sweden as in Norway, there is a greater interest in the direct importation of barrel apples. Many importers will not handle larger sizes than the 138's.

The box pack is the favorite in Denmark, although some varieties are shipped in barrels. The box size desired varies from 150 to 225, but the large sizes are heavily discounted in value.

Several steamship lines run between New York and Norway. The ocean freight rates are 72 cents per cubic

Continued on page 23.



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FOR EVERY PURPOSE

Pumps tested by time and hard service—pumps that have proved themselves worthy in thousands and thousands of installations—each a leader in its particular field and as reliable as we know how to build it—styles and sizes to meet all pumping requirements—elegant designs, attractively finished to please the eye and harmonize with the surroundings—operation by hand, windmill, gasoline engine, electric motor or other power—make up the line of MYERS "HONOR-BILT" HAND AND POWER PUMPS for Every Purpose. Simplified construction, easy installation, low cost of operation, dependable long-time service are Myers Talking Points.

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New Fall Catalog

Our new 64-page Fall Catalog of **Flowering Bulbs, Roses, Fruit, Shade and Ornamental Trees and Shrubs** is now ready for you.

We offer you the "highest quality" stocks of **real merit**, varieties especially adapted to this coast. Twenty years' practical experience here enables us to do it intelligently.

FALL SEEDS—Complete Seed Catalog on request. Write for prices on Fall Grain and Grasses, stating quantities wanted.
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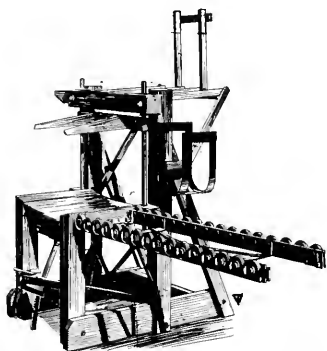
Routledge Seed and Floral Co., 145 Second Street, Portland, Oregon

THE SUCCESS LINE IN ORCHARDS

MEANS

Maximum Efficiency and Economy

THIS BOX LIDDING MACHINE



\$65.00 F.O.B. Spokane

Built on new principles, is adaptable to any style packing house, for it has open back and ends permitting the free passage of boxes in any direction. Roll feeders and carriers attach at either end or back.

Extra heavy construction, assuring full rigidity and perfect alignment.

Adjustable to any size boxes.

Pressmen in large packing plant say: "It's the swiftest, surest and easiest operating of any press on the market and will outlast five other machines."

Spokane Valley Fruit Growers Association, of Opportunity, Washington, largest fruit packing house in the Northwest, has discarded all of its old lid presses and installed Eight New Success Lidding Machines after a thorough investigation.

It will pay you to investigate too.

The Success Ewing Orchard Ladder

Built on scientific tests and calculations and of AIRPLANE SPRUCE.

It is the lightest ladder on the market. Built for strength.

8-foot ladder weighs 27 pounds
10-foot ladder weighs 31 pounds
12-foot ladder weighs 40 pounds
14-foot ladder weighs 44 pounds
16-foot ladder weighs 53 pounds

No Wobble -- Always Steady

Dealers Write for terms and our liberal contract. Some choice territory still open for reliable dealers

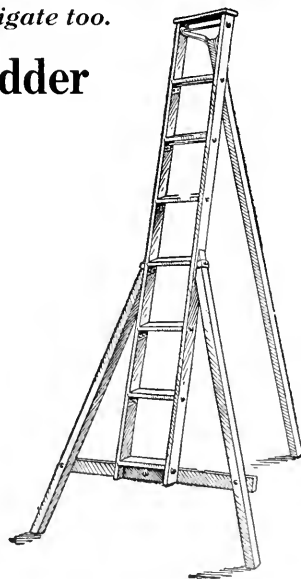
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SPOKANE, WASHINGTON

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Orchard Supplies, Fanning Mills, Seed Graders, Pea and Bean Threshers,
Foundry Work, Buckets, Chains, Wire and Zinc Screen



65c a foot F.O.B. Spokane

BETTER FRUIT

An Illustrated Magazine Devoted to the Interests of Modern Fruit Growing and Marketing.
Published Monthly
by

Better Fruit Publishing Company
703 Oregonian Building
PORTLAND, OREGON

The Volstead Act.

Fruitgrowers generally should be interested in securing the passage of the Volstead act at the next session of Congress as it is framed to give their marketing associations features that are necessary to make them a co-operative success. It was believed that it would be passed during the past session, but owing to opposition and the short time between its introduction and the adjournment of Congress, was held over. Owing to this fact, several of the large co-operative fruit-marketing associations have found it necessary to change their form of organization this year in order to keep within the law in marketing their crops.

Since Congress has adjourned, if the statements of candidates and politicians are to be believed, there has been a change in sentiment in regard to the Volstead act, and it is stated by those who are carrying on the fight for it that it can be passed if the fruit-growers and fruitgroves' associations of the country get solidly behind it. Growers, therefore, have both an opportunity and a duty to perform in furthering its passage and should personally take steps to help in pushing it through Congress.

The New Prune Pest.

The depredations of the red spider in Idaho prune orchards, as noted elsewhere in this number in an article by W. H. Wicks, head of the Bureau of Plant Industry of Idaho, should serve as a warning to prune growers in other sections of the Northwest. Up to the present time, the work of this insect in Northwest orchards has been limited and little attention has been paid to it, although it has been a serious pest in the orchards of California for some time.

In Mr. Wick's article, he tells of his habits, the results of its work and methods that his experiments have shown are successful in its control. As a pest of this kind spreads rapidly, prune growers in the Northwest section should watch their orchards carefully and where there is any indication of its appearance, take the necessary measures to eradicate it.

As the Stranger Sees Us.

It frequently takes an outsider to bring to us a new point of view in regard to the possibilities and resources of a district that we have become so familiar with that we disregard them. This, to a large extent, is the case with the article appearing in this issue by W. H. Olin on "Utilizing the Fruit Crop of the Northwest." Having taken a swing around the

country and seen what is being done in developing the fruit industry here in comparison with other sections of the United States that he has been visiting, Mr. Olin becomes enthusiastic and tells us of many things that we are prone to overlook. Even the drawbacks of unfavorable marketing conditions and unseasonable weather are forgotten in reading what he says about the development and the future of the fruit industry in the Northwest, and we are deeply impressed with the conviction that the industry is being stabilized and future avenues made for the output of the fruit products of the Pacific Northwest, fresh and processed, that must mean success. Mr. Olin's article has the punch that stirs to greater activity, particularly when it carries with it the conviction that it is based on facts. The fruit industry of this section is, indeed, assuming huge proportions and bring with it a new and enlarged prosperity.

Increased Freight Rates.

It is announced that the increased rate allowed the railroads on Northwestern box apples is seriously hurting the industry and that unless some relief is afforded, that it cannot survive. This is said to be particularly the case this year, with big crops of apples in the East that are grown much nearer the big markets.

Sales that have taken place on the Coast this year have been on such a narrow margin of returns to the grower that the production cost is said to be eating up the profits. This being the case, it is apparent that some agreement should be reached between the railroads and shippers, whereby there would be a readjustment of the rates. By joint application to the Interstate Commerce Commission this could be accomplished. As a matter of fact, business conditions have very materially changed since the time when the new rates were being considered. Apple prices, like other commodities, have taken a decided drop, and in asking for a re-hearing, this feature should have considerable weight outside of the fact that any railroad tariff that jeopardizes the life of an industry is not sound business practice, for eventually the carrier will suffer as much as the shipper.

What Papers Interested in Fruit Are Saying

According to Etlert Johnson, Technical Assistant of the California Department of Agriculture, in an article in the Department Bulletin the puncture vine, a peculiar form of vcb vegetation vegetation which punctures bicycle and automobile tires is the latest pest that California has to contend with.

The earliest report of the puncture vine in California was in 1903, when it was found growing along a railway bank at Port Los Angeles. In 1908 it was found in abundance in the Southern Pacific yards at Colton, and was also collected near San Bernardino. In 1912 it was reported as a troublesome weed in the vicinity of Bakersfield. It has now spread over a large area in the upper San Joaquin valley and is found in a nearly unbroken line along the railroads northward to San Joaquin county. In the Sacramento Valley, it has been found at Woodland, Durham

and Marysville, and is reported as widely spread along the railroads in Tehama county.

South of Tehachapi, the puncture vine is found from the Mexican border through the Imperial and Coachella valleys to the eastward valleys of Riverside, San Bernardino, Los Angeles and Orange counties.

From the rapidity of its spread in the upper San Joaquin Valley in the last ten years, it is to be expected that the pest will continue to extend its limits from these newer centers of infestation until something is done to check it.

The plant produces numerous prostrate stems which frequently grow to a length of eight feet. At every joint is produced a number of hairs, usually five, which separate as soon as they mature. Each hair possesses two or more sharp spines about the size of carpet tacks, so disposed that however the hair may fall, one spine will always point upward. These spines will pierce an automobile tire the tread of which is somewhat worn, and will readily puncture a bicycle tire.

We have almost reached the crisis in the wage scale, and any increase in the wages for employes outside of the farming districts will certainly cause a re-acton which will tend to make the situation worse. Up and up we have moved the wage-scale, until the dollar has little value, but a bushel of potatoes or other food is a highly prized article. For some time wages have only had a tendency to make food more scarce and higher in price. The workman, though earnest in his theory that what he needs to solve his problems is a higher wage scale, is gathering around a delusion. The remedy does not lie in an advance but in a reduction in the scale. If we would begin to lower wages along with the prices for the necessities of life, we should see the value of a dollar begin to increase in worth, and soon a dollar would be worth a dollar.—Southern Fruitgrower.

Modern Farming says: "No intelligent person will deny that our present system of distribution of farm products is faulty. The solution, however, does not lie in the elimination of the crooked, inefficient middleman, and the proper regulation and protection of those remaining. The honest middleman will not oppose legitimate regulation; he considers it his duty to be as candid as possible by increasing the confidence of his shippers, and by raising the plane of the commission business."

Interest is still keen in watching the development of the Leonard Coates 14-18 prune. On the invitation of Ronald H. Coates a goodly number of prominent horticulturists gathered at the home and orchard of Mr. Coates August 27th to inspect this specimen of improved French prune. Its designation "14-18" means the years during which Mr. Coates was developing it to bearing trees. The particular orchard under inspection at the present is ten acres of peach trees top-worked to this and some other varieties of prunes. The 14-18 certainly makes a very attractive showing in the orchard. The trees were evenly and well loaded with fruit that ran evenly in size close around 30's. It was smooth clean, rounded, with a flesh of fine texture. In the opinion of those present it is by far the best specimen of improved French prune yet found in the search for the ideal. To be conservative, we must say it is still too early in its testing to be sure of all its qualities. Experts in breeding stock or trees know that early in the evolution of any strain there is a liability of individuals to revert back to early type. That only after a number of generations can such unreliable individuals be eliminated.—Sunset Standard.

A Correction.

Editor of Better Fruit, Portland, Ore.:

Dear Sir:

I have just read the September number of Better Fruit. On page 12, under the heading "Combating Fire Blight" you have made a serious mistake. You state "The wounds should be disinfected with one grain of cyanide of mercury and one gram of bichloride of mercury to 500cc of water. This combination is an effective disinfectant for both wounds and tools, according to Prof. F. C. Reimer."

This should read one gram of cyanide of mercury instead of one grain.

I would appreciate it if you would correct this in your next issue. With kindest regards, I am

Very sincerely yours,

F. C. REIMER.

The Refrigerator Car Shortage Problem

IN discussing the car shortage situation that usually obtains during the apple shipping season, a well-known railroad man says:

"The railroads, like the fruit growers, have their problems, and an exchange of information and ideas that will create a better understanding and a closer co-operation between the grower and shipper on the one hand and the railroads on the other is essential.

"Apples are a seasonal commodity, and every fall the railroads are confronted with an enormous volume of apples to move in the shortest possible time. This movement comes also at the same time as the wheat and hay and lumber traffic. If there were no apples to ship at all, the usual fall rush of other principal farm and forest products would give the railroads a goodly amount of tonnage to handle. Such non-perishable products as wheat and lumber and shingles move every month in the year and, while the offerings are larger in the fall, the movement is steadier and longer, and there are no losses to be feared on account of weather or not getting into eastern markets quickly.

"If the apple movement was an all-year-round affair, there would be sufficient refrigerator cars in the country to handle it, but it is compressed chiefly within a ninety-day period.

"For three months of the year, Au-

gust, September and October, the equipment about balances the offerings; then for November, December and January the offerings are in excess of available cars. The split might be several weeks earlier or later, according to conditions which fluctuate some years. Then for the balance of the year a large part of the refrigerator cars are not in use.

"Along in July the railroads begin to head their refrigerator equipment toward the points where it will be needed in the fall.

"These empty refrigerators are accumulated and stored in yards and at stations against the time when they will be needed.

"The railroads go into the season with as large a surplus of refrigerators as it is possible to accumulate, and supplement it with all other refrigerators that can be rounded up and worked westward during the shipping season. The empty car mileage on refrigerators is naturally heavier than on box cars.

"Considering their limited use and idle time, the greater initial cost and interest on investment, and the greater empty car mileage, the carriers would not be justified in attempting to own as many refrigerator cars as would be equal to the size of the crop to be moved.

"During federal control of the railroads, refrigerator cars were pooled

and used in any part of the country where most needed. When the railroads get their tangled car situation finally straightened out this would seem a desirable and necessary arrangement to continue if possible. All of the refrigerator cars in the country would then be available in the Northwest to draw from to move the apple crop. At other seasons they would be available in the south and southwest, or at other points where needed.

"It would require an unreasonable amount of capital to be tied up in equipment that would be idle the greater part of the year, if every railroad acquired sufficient cars of its own to move its crop."

Spraying For Anthracnose.

Spraying for anthracnose on apple trees should be done just as soon as the apples are picked and before the fall rains commence. While you may be fairly satisfied that your trees are free of this disease at the present time it must be remembered that when the rains come it germinates rapidly and may become widespread in your orchard if you neglect preventive measures. A thorough spraying of Bordeaux mixture at a strength of 6-6-50 before the rains permit the spores to develop is the best treatment for destroying anthracnose in your orchard.

Standard of the World—Hoover Potato Diggers



Roller Bearings, Tempered Steel Elevator, Steel Sprockets and Steel Sprocket Chains, Frames and Beams made of Bessemer Steel and Charcoal Malleable Castings. Double Action Tongue Truck.

Fill out coupon and we will send you catalog and tell you more about this digger.

John Deere Plow Company, Portland, Oregon
Spokane, Seattle, Boise

Name Town State
I have acres of potatoes.



For President
WARREN G. HARDING



For Vice-President
CALVIN COOLIDGE

A Square Deal for the farmer

If the farmers of the United States think they have nothing at stake in this election—if they think it is simply a contest between the political “ins” and “outs” and that it makes no particular difference to the farmer which wins—they are making a very great mistake, and are likely to realize it when too late to help themselves.

In some matters of interest to the farmers the two parties agree.

For example, both favor strengthening the rural credits statutes; both recognize the right of farmers to form co-operative associations for the marketing of their crops; both favor extending our foreign markets; both are pledged to the study of the cost of producing farm crops.

Now, the matters mentioned are important, but not nearly so important as certain other matters; and in the way they look at these tremendously more important matter we find a radical difference between the Republican and the Democratic parties.

The difference is so vital that if the farmers of the country once understand it, there will be not the slightest doubt as to which party they will support at the polls in November.

The farm voice in government

The Republican party in its national platform is committed to “practical and adequate farm representation in the appointment of governmental officials and commissions.”

Are not farmers entitled to such representation? The Republican party thinks they are.

Under Republican rule, for sixteen years that sturdy and faithful Iowa farmer, “Tama Jim” Wilson, was at the head of the great Department of Agriculture.

What happened when the Democrats came into power?

Why, they turned out “Tama Jim” and put in a university professor who knew nothing about agriculture and gave no evidence of caring anything about it.

Farm interests are vitally affected by the administration of the Federal Reserve banking system, by the Farm Loan system, etc. Should not thoroughly competent men who understand the farmers’ needs and who have a sympathetic interest in agriculture be on these boards?

The Republican party thinks they should and says so. The Democrats were asked to include a similar pledge in their platform, but they refused. Why?

Price fixing and price drives

Both parties were asked to promise to put an end to price-fixing on farm products and to government drives to beat down prices of farm products.

The Democrats refused to make such a pledge. The Republicans agreed and in their national platform are pledged to “put an end to unnecessary price-fixing and ill-considered efforts arbitrarily to reduce prices of farm products which invariably result to the disadvantage both of producer and consumer.”

Do you remember what happened when we got in the war? Do you remember President Wilson’s definition of a “just price”? He said:

“By a just price I mean a price which will sustain the industries concerned in a high state of efficiency, provide a living for those who conduct them, enable them to pay good wages, and make possible the expansion of their enterprises.” etc.

And then do you remember what happened? Government contracts of all kinds were let on a cost-plus basis. That is, the manufacturer was allowed to figure all of the cost of every kind which he incurred (and he was not restricted in his expense) and in addition was allowed

(Continued on next page.)

A Square Deal for the Farmer

(Continued from the preceding page)

Government drives against farm prices

to figure a handsome percentage on top of all his expense and fix his price to cover everything.

Was the farmer allowed that "just price" which was granted so freely to others? He was not.

Prices on some of his products were absolutely fixed, and without investigation of the cost of production.

One prominent member of the Democratic administration when asked about the cost of production of farm crops is reported to have said that this was no time to investigate farm costs of production; that it was the farmer's business to produce and not bother his head about the cost.

Throughout the war the farmer was frantically urged to produce by one crowd, while another crowd was using every device of market manipulation to hold down prices of farm products. Was that fair?

But, someone will say, we were in war, and the farmer should not complain about what it was necessary to do, even if they didn't do it to others.

Very well. Let us overlook what happened during the war. Let us wipe the slate clean up to the signing of the armistice. Let us consider what has happened to the farmer since the war ended.

The farmer had been urged to produce to the limit and had been assured that even if peace came, all he could grow would sell at profitable prices.

Do you remember the price drive in January, 1919, within three months after the armistice had been signed?

Do you remember the more determined drive in July, 1919, when hogs dropped

from \$22.10 on July 15 to \$14.50 on October 15, although pork products to the consumer dropped on an average less than 10%? In June, 1920, hogs were selling at \$5.50 less per hundred than in June, 1919, but retail ham prices were \$3.00 per hundred higher.

As a result of the government drive the producer received less and the consumer paid more. Who benefited?

And do you remember the government drive of the last three months, and what it has done to the prices of grains and livestock?

Within two months the prospective value of the 1920 corn crop decreased three-fourths of a billion dollars. Great advertisements announced that the government proposed to cut down the cost of living by dumping on the market the millions of pounds of government surplus meat at bargain prices.

Have you been making so much money on your cattle and hogs that you can afford further reductions in prices?

In July, 1919, No. 2 corn sold in Chicago for \$2.19 per bushel; in July, 1920, for \$1.56, a decrease of 29%. In July, 1919, steers sold in Chicago for \$15.60; in July, 1920, for \$15.00, a decrease of 4%. In July, 1919, hogs sold in Chicago for \$21.85; in July, 1920, for \$14.85, a decrease of 33%. The decrease in wool prices was 25%. In beating down prices of these products did the government help the consumer?

According to the United States Bureau of Labor Statistics, the consumer paid 24.1% more for his food articles in July, 1920, than in July, 1919. He paid 12.4% more for his clothing; 47.4% more for his fuel and lighting. During the same time, metals and metal products increased 20.8%, lumber and building material 79%, house furnishing goods 47.8%. But ac-

cording to the same authority all farm products had decreased over 4% in July, 1920, as compared with July, 1919.

We shall not deal further with this sickening story of incompetent and inefficient government meddling. You know the story in most of its details.

As you think it over, remember this one outstanding fact: That the Democratic party, if continued in power, is committed to the same sort of a policy in dealing with the farmer and stockman that it has followed during the past two years. It was asked to promise to stop officious meddling which benefits only the speculator and the profiteer, but it refused to make such a promise.

In justice to themselves and their families and the generations to come after them, the farmers of the United States should put in power the Republican party, which realizes its obligations to them and to all other classes of citizens, and which further realizes that if the farmer is not given a square deal, our agriculture is going to be wrecked.

Talk to your neighbors about these things and make sure that they understand what a vital interest the farmer has in the presidential election November 2.

Republican National Committee

Republican National Committee,
Auditorium Hotel, Chicago, Ill.

Please send me, free and postpaid, copy of Senator Harding's Address on the present day problems of the farmer.

Name

Address

The Importance of Wiping Fruit

Where fruit growers late in the season have sprayed fruit so heavily as to leave a residue on it, the United States Department of Agriculture is again urging them to remove the coating by wiping or other means that will make the fruit acceptable in the market. One method recommended for apples and pears, which can be followed at a cost of a few cents per box, is to wipe the fruit with cotton gloves. It is pointed out that if heavy rain-falls do not occur after heavy late sprayings the coating that remains may disfigure it sufficiently to arouse apprehension in the minds of the consumers, even though the residue may be entirely harmless. In some cases, however, heavy late spraying has been sufficient to be actually injurious and so subjects such fruit to seizure under State or Federal food and drug laws.

Where apples and pears when harvested show evidence of spray residues which have not been removed in picking, handling, grading and packing, it is recommended that such fruits be systematically wiped before being placed on the market or packed for shipment. While this precaution is

applicable to all fruit sprayed late in the season, it is especially important in the more southern apple districts where the grower is often compelled to spray late to protect the fruit against bitter rot, and in irrigated orchards of the West and Northwest where protection of apples and pears against the later broods of the codling moth is secured by spraying with arsenate of lead.

While at this season the Department's specialists are laying emphasis on the importance of wiping fruit that has a residue from spraying, they also take occasion to urge that no grower should suppose fruit injury resulting from neglect of proper spraying early in the season can be corrected by belated spraying. Heavy late spraying undertaken in an effort to make up for what should have been done earlier is strongly condemned.

The practice of spraying growing fruit properly marks one of the most important steps in horticultural progress and is responsible, to a large extent, for the sound, attractive appearance of fruit now on the market, which is in marked contrast to the insect-injured and disease-spotted fruit so prevalent a few years ago.

Why Better Fruit Helps

Just as important as adequate tools for use in your orchard is a comprehensive knowledge of the principles behind their use.

A strong back and a weak head may make for success in some lines of work, but not in the business of commercial fruit growing as it is practiced today.

Give me rather a cripple in a wheeled chair who knows *why* than the muscle-bound giant who works so hard he has no time to read and study.

Better Fruit gives you just the information you want at the time you need it.

Each issue of Better Fruit is crammed from cover to cover with seasonable information and interesting news notes pertaining to your business.

You should read it, for it is instructive and helpful to you as a fruit grower.



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We solicit your consignments and our Mr. Birch will be in this country every fall to arrange for shipments. Our business necessitates, in addition to shops and stands in the most central position of Covent Garden Market, twelve great warehouses, with a floor space of between five and six acres. Through these warehouses in the course of a year there passes an average of three million packages.

We have world-wide connections.

No part of the world where fruit is grown and exported escapes our notice. In addition to the hundreds of places in the British Isles from whence our supplies are derived, we import fruit from America, Canada, Australia, Tasmania, South Africa, Spain, Canary Islands, Azores, Portugal, France, Italy, Belgium and Holland. We are now directing particular attention to offering American and Canadian growers the great POUPART service. We make advances to cover freight and accessory charges.

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MR. SAM BIRCH
HEADQUARTERS, KALAMALHA HOTEL
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Experiments with Pickering Bordeaux Spray

EFFORTS to obtain a copper fungicidal spray for fruits and vegetables that would be as efficient as but less expensive than standard Bordeaux mixtures, have led to encouraging experiments with the Pickering Bordeaux sprays, the results of which are contained in a bulletin now issued by the United States Department of Agriculture. The high price of copper sulphate, known as bluestone or blue vitrol, during the war caused chemists of the department to turn their attention to the Pickering Bordeaux sprays, which contain less of this high-priced chemical.

The so-called Pickering Bordeaux sprays had been tested to a limited extent in England, where laboratory tests indicated that they were more efficient per unit of copper than the Bordeaux sprays. Pickering sprays, sometimes called Pickering limewater sprays, are prepared by mixing saturated limewater with diluted solutions of copper sulphate, and contain their copper in the form of basic copper sulphates. If the results obtained by Pickering, the British chemist, from whom the sprays get their name, in the laboratory in England hold true under field conditions in America, it is obvious that a great saving in copper in this country may be effected.

It is believed that the experiments by the department lay a basis for further studies to be conducted in various parts of the country. The opinion is expressed that from the information provided in the bulletin the various agricultural experiment stations and other agencies in the country will be able to devise formulas for copper fungicidal sprays for certain crops made with less copper sulphate than standard Bordeaux, which will prove just as efficient as the more expensive sprays. It would be impracticable, it is pointed out, for the department to devise these formulas itself. Field conditions vary in different sections of the country, and experiments would have to be conducted in these different sections in order to work out a spray suitable to local needs.

Tests Cover Three Seasons.

The experiments, which covered three seasons, were conducted with Pickering Bordeaux sprays containing the equivalent of from .06 to .7 per cent of copper sulphate. Their efficiency was compared with that of standard Bordeaux mixtures containing the equivalent of from .75 to 1.25 per cent of copper sulphate.

The results of the tests made on potatoes in Maine indicated that, per unit of copper present, the Pickering Bordeaux sprays were twice as effective as the standard Bordeaux mixture. The strongest Pickering Bordeaux sprays, containing the equivalent of from .6 to .7 per cent of copper sulphate, controlled late blight on potatoes and the fungous rots of cranberries in New Jersey very effectively.

Their control of certain fungous diseases on grapes and apples was not definitely determined, the results being complicated by burning or other injury to the foliage and fruit. Pickering sprays containing less than the equivalent of .6 per cent of copper sulphate were not effective as fungicides for potatoes and probably not for cranberries.

Increased yields of tubers were obtained on plats of potatoes treated with standard Bordeaux and with the stronger Pickering sprays, indicating that the latter sprays exerted similar stimulating and protective action on the plants. The adhesive properties of Pickering Bordeaux sprays varied

with the foliage to which they were applied. They adhered to potato and cranberry leaves in practically the same degree as the standard Bordeaux, to apple leaves in a somewhat higher proportion, and to grape leaves in a lower proportion.

No Harm to Maine Potatoes.

No injurious effects followed the application of Pickering Bordeaux sprays to potatoes in Maine or to cranberries in New Jersey. The sprays, however, proved to be too caustic for use on apples in Virginia or on grapes in New Jersey and Virginia. Pickering Bordeaux sprays, it is said, can not be used on tender foliage.

Barium-water sprays of the Pickering type, made with barium hydrate instead of lime and containing the

[This is one of a series]

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If you were a tree,
After a big crop and long summer,
You would want a rest,
A rest from growth and insects.
Give your trees an early bath with

ZENO

It will kill the various scale,—stop their damage,
Destroy the eggs of red spider and aphid,
Which would later mean millions of insects, and
Destruction to the crop—harm to the trees.

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Is an internationally used
Miscible oil spray, and these are reasons why
It has proved the best by years of test.

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Beautiful pencil boxes with assortment of pencils and pens

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equivalent of .7 per cent of copper sulphate, proved very successful against the late blight of potatoes in Maine. Such a spray containing the equivalent of .6 per cent of copper sulphate was tested one season in Virginia and did not injure the foliage or fruit of the apple trees.

Remedies for Pear Slug.

To destroy the pear and cherry slug, which is said by Prof. A. L. Lovett, entomologist at the Oregon Agricultural College, to be unusually active recently, spray with one pound of arsenate of lead powder to 50 gallons of water. Sulphur, air-slacked lime or wood ashes sifted over the foliage are also said by Mr. Lovett to be good remedies to apply for this pest, which destroys the foliage and is especially destructive to young trees.

Pruning Cane Fruits

By Gordon G. Brown, of the Hood River Experiment Station.

Considerable difference in the management of cane fruits has taken place during the past few years. Probably no district has done more to demonstrate different systems than the Puyallup Valley growers. Formerly the policy was to grow raspberries in hills, four to five feet apart. When the new canes were four feet high they were headed so as to throw out laterals. Now, however, they have found it more practical not to prune at all during the growing season but to permit the canes to grow as tall as possible. Where this was done, planting was about three feet apart in the row.

During winter the side shoots are trimmed off, leaving a long whip-

shaped cane. These canes are trained to a wire or permitted to lay over a hop pole. This plan gives a much longer harvesting season since the earliest and consequently the highest-priced berries are borne on the ends of these long canes. It has been estimated that where the grower removes the top of his bush berries he is cutting off at least 25 per cent of the crop and by so doing causes his harvest to ripen at nearly one time instead of over a much longer period.

Care of Nursery Stock

Have someone receive the stock upon its arrival at the postoffice or express office at the other end of the route. Have them heel the trees in a moist, shallow, trench, covering the roots with moist earth and leaving the tops out but shaded from sun or protected from drying winds, and so hold until someone is coming to your place or until you can go in to get them. The trees will thus be protected from drying out and will be in good condition, with such treatment, for a week or so. In carrying them home, keep the roots moist and covered, away from the sun and dry air.

Miscible Oil Demand Increases.

The larger demand for miscible oil as a spray for certain varieties of orchard pests has resulted in the location of the headquarters of distributing agents at available points in the Northwest One of the latest to establish an agency in this section is the East Bay Chemical Company of California, which has made Spohn & Wing Northwest distributors for their miscible oil spray Zeno. Spohn & Wing have established their headquarters in Portland.

All Fruits and Vegetables Can Be Shipped In



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Write for FREE monthly bulletin. Tells how to spray, pack, ship, how to avoid shipping losses, how to get top market prices. Illustrated.

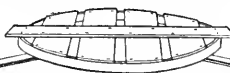
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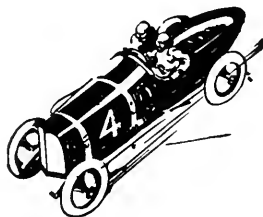
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**STANDARD OIL
COMPANY**
(California)



*A grade for each
type of engine*

Scandinavia a Market for Northwest Apples

Continued from page 14.

foot for boxes and \$1.94 per 100 pounds for barrels. The duty on apples is about 1½ cents per pound.

There are also several good lines connecting this country and Sweden. Regular schedules are maintained between New York, Stockholm and Gothenburg. The ocean rates on apples are \$3.50 per barrel and \$1.40 per box. The duty on apples entering Sweden is somewhat less than 1½ cents per pound.

Boats run from New York to Copenhagen twice and sometimes three times a month. Ocean rates are 70 cents per cubic foot and \$3.25 per barrel. The duty is negligible, being about 6¼ cents per 100 pounds.

There is practically only one way of transacting business in the apple trade between this country and Scandinavia. The actual importers prefer to do business through resident agents on a commission ranging from 3 to 10 per cent, which is arranged for and included in the quoted price.

The resident agents receive cable quotations f. o. b. New York. They present these to a clientele of apple importers and cable the acceptance. The transaction then becomes one between the importers and the shippers on the basis of cash against documents or sight draft attached to bill of lading, and payable before inspection or delivery at the bank in the foreign port. Inspection on behalf of the importer at port of shipment is not usual, though sometimes arranged.

The agents do not handle the cash. The shippers receive the total amount from the importers through the bank and settle with the importers quarterly or as arranged. The duties of the agents are confined to placing orders and to making necessary adjustments, etc.

The main essential to success in business conducted this way is delivery of the goods at the time promised. Failure in this respect offers the only reasonable loophole for rejection. An importer who purchases for the Christmas trade can not be held to his contract for apples that arrive at the end of January.

Many importers obtain their supply of trans-Atlantic apples at the apple auction in Copenhagen, where free port facilities offer special inducements for this business. Sales are held every Monday and Thursday. Although the auction is confined to Copenhagen buyers alone, sales notices are sent out all over Norway, Sweden and Denmark, and outside merchants arrange to purchase through members of the auction.

Soil For Strawberries.

Soil for planting strawberries should be thoroughly prepared before they are planted. Failure in this respect usually means a poor yield as strawberries require abundant humus to

thrive properly. Probably the best results are obtained from growing and turning under a green manure crop although heavy applications of stable manure will greatly aid in supplying the lack of humus. In planting strawberry plants in the fall care should be taken to have the rows well filled up to prevent the roots from freezing.



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SLOAN'S LINIMENT is an effective counter-irritant that penetrates to the affected part, without rubbing, scatters the congestion, and promotes a warm, comfortable relief. Try it when your "bones ache" and you feel you "can hardly stand up any longer."

For more than 38 years Sloan's Liniment has been used by the families of the nation in quickly relieving rheumatic aches, lumbago, neuralgia, sciatica, lame, sore, strained muscles, bruises and other pains and sprains. Put up in convenient bottles in three sizes—the larger the bottle the greater the economy. 35c, 75c, \$1.46.

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38 x 3 1/2	13.00
38 x 3 3/4	14.25
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38 x 4 1/2	14.50
36 x 5	14.75
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We can furnish all size **REINFORCED FREE WITH EVERY TIRE**. Send \$2.00 deposit on every tire ordered, or deduct 10% Special Discount if Full Amount Accompanied by Order. We'll ship subject to your examination. State whether a. s. l. or other material desired. Prompt shipment.

SPaulding TIRE COMPANY
1654 Ogden Ave., Chicago
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Notes on Oregon Nut Growing

Continued from page 12.

feeted the most seriously of any of his varieties. DuChilly shows some little injury but produces a heavy crop, regardless of this pest.

Dorris was one time the asparagus king of the valley and still ships large lots of this product but is gradually doing away with this product as well

as his peaches and other crops and plans eventually to have his whole farm in filberts. Recently his nephew, a veteran of the great war, has become associated with Mr. Dorris, and between them they are crowding the filbert end of the business to the limit. They are layering thousands of plants each year, being occupied in this work from December until April. They are experimenting with the use of nitrate in this work, but their work has not been conclusive in this direction as yet.

The past winter and spring has been a most trying one on our orchards of all kinds. The temperature went down to 20 degrees below zero (it very seldom drops below zero in this valley) early in December before the trees were completely dormant. Trees of all species were injured more or less, but the filbert came out of it with less injury than almost any other type of tree. In some cases in certain low locations the catkins and at times also the pistillate buds, were frozen above the snow line, as were those of our native hazel in similar locations. A few limbs on the southwest sides of the trees have died since, evidently from the freeze injury, but in many other locations no injury at all was apparent. The Dorris planting, the Forbis planting at Dilley, and many others in the valley are producing heavy crops this season and show no ill effects from the intense cold.

The walnuts in the lill sections are generally in very good condition and are bearing good crops of nuts at the present time. In the valley sections, however, perhaps 50 per cent of the walnuts were frozen to the snow line. Baldwin and Spitzbergen apples in the same locations were completely killed, and many varieties of peaches were killed to the snow line. In general, however, it was the trees that were unfavorably situated in some manner, having poor drainage or having been poorly tilled or being planted so close that there was not an abundant supply of food and moisture to keep them in good vitality that were most severely injured. Although the vigorous trees showed the most apparent injury just after the freeze, their bark being discolored to a chocolate brown and at times being separated from the body of the tree, still they had the vitality to recover while many of the trees in poorer vitality in the crowded orchards, for example, although showing less apparent injury, failed to recover from the shock.

The big freeze has served to emphasize the fact that while there are thousands of acres of land in the Willamette valley that are favorably located for walnut culture, there are many more thousands that are unsuited for their best growth, and that while the plantings will do fairly well on many of the less favorably located lands, it is those growing upon the well situated sites that have the best chance to survive unfavorable seasons.

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SIMPSON & DOELLER Co.
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**WE CARRY—AND CAN SHIP IN 24
HOURS—STOCK LABELS FOR PEARS,
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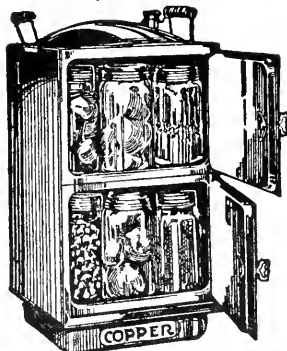
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Conservo Cooker

No. 20—Conservo, 21½ inches high, 11½ inches square; 4 removable shelves; 2 pans; cooks for 3 to 15 persons; holds 14 one-quart jars for canning. No. 9—Conservo is 12½ inches high; 2 shelves; 1 pan; cooks for 2 or 3 persons; holds 6 one-quart jars for canning.

Works on any stove—wood, coal or gas

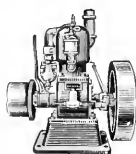


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Full Stock of Repairs at Portland

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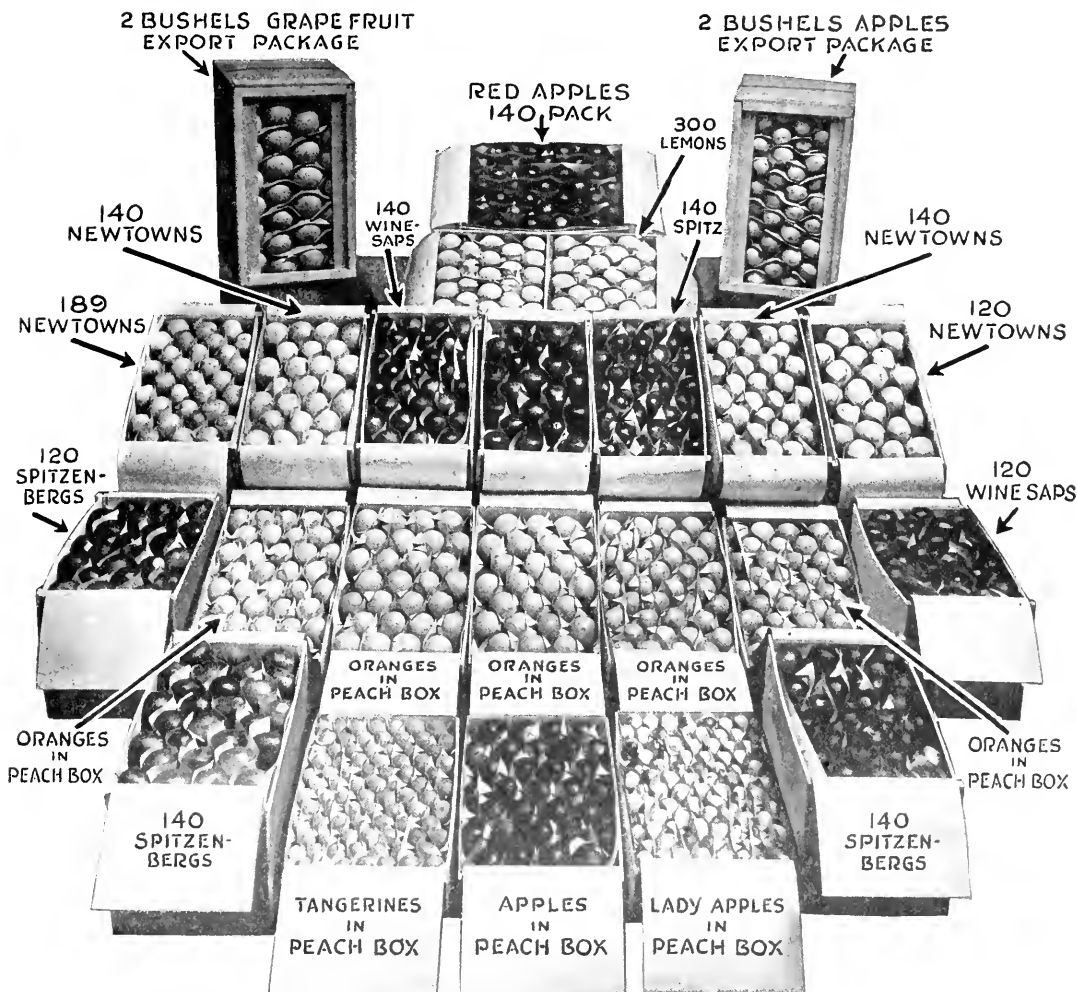
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WHEN WRITING ADVERTISERS MENTION BETTER FRUIT

Northwest Fruit Notes From Here and There

OREGON

Reports from the cranberry-growing districts in the Marshfield district are to the effect that the largest crop of these berries will be harvested in that section this year in its history. Help for harvesting the crop it is believed will also be plentiful.

At a recent meeting of the board of directors of the Hood River Apple Growers' Association, E. W. Birge was elected president of the organization to succeed P. S. Davidson, who resigned. O. B. Nye was elected vice-president to succeed A. F. Rickford.

The schedule of prices for prunes recently announced by the Oregon Growers' Co-operative Association, which expects to handle the largest tonnage of Oregon prunes during the present season, is as follows:

30-40's, 15 cents bulk basis, or 18¾ cents in 25-pound boxes.

40-50's, 13 cents bulk basis, or 16¼ cents in 25-pound boxes.

50-60's, 11½ cents bulk basis, or 14¼ cents in 25-pound boxes.

60-70's, 10 cents bulk basis, or 12¼ cents in 25-pound boxes.

70-80's, 9 cents bulk basis, or 10¾ cents in 25-pound boxes.

80-90's, 8 cents bulk basis, or 9¼ cents in 25-pound boxes.

90-100's, 7 cents bulk basis, or 7¾ cents in 25-pound boxes.

Recent estimates of the Hood River apple crop place it at 70 per cent of last year's yield when 2,000,000 boxes were shipped. Growers there are now looking for a 2,000-car crop.

The Western Fruit Company, with a capital stock of \$10,000 and with headquarters at Salem, has been incorporated by F. Howard Zinser, W. J. Spalding and Ariel D. Zinser.

The first car of Rogue River Bartlett's of the 1920 crop to reach Chicago sold for \$2,886 gross, or an average of \$5.55 per box. Another car sold for \$2,783 per car, or \$5.28 per box. The above sales are said to break all record for pear sales in car lots from Medford.

A survey of the farm acreage in Marion county for 1920 shows that the fruit acreage has increased very materially recently, when compared with former years. The statistics recently given out in regard to fruit in this

county show 8,552 apple trees in bearing; apple trees, non-bearing, 575; cherry trees, peach trees, bearing, 352; peach trees, non-bearing, 79; pear trees, bearing, 1,051; pear trees, non-bearing, 943; prune trees, bearing, 13,825; prune trees, non-bearing, 6,935; walnut trees, bearing, 257; walnut trees, non-bearing, 1,675; loganberries, 3,446; blackberries and raspberries, 2,940; strawberries, 875; other fruits and nuts, bearing, 250; other fruits and nuts, non-bearing, 204.

According to a report from Roseburg a severe wind storm that visited that section during the middle of September, blew down and injured 35 carloads of apples so badly that they could not be saved for shipment. About 50 per cent of the apples that were ripe at that time, it is declared, were rendered unfit for anything but immediate use. In the Hood River district, late varieties of pears were injured by the windstorm. The apple loss in this district was also considerable.

Oregon bee men are informed by the Oregon Agricultural College at Corvallis that they may now have the help of a trained bee specialist, as H. A. Scullen, a successful commercial bee man, has been employed by the college to take up this work.

The Hood River county fair, which was one of the most successful held in recent years, and had a large attendance, was characterized by a fine exhibit of early apples. In an apple packing contest that was held, "Shorty" McManan, a professional packer, was the winner. He packed two boxes of apples in a little over five minutes. Miss Pearl Nerrill scored second in the contest.

Oregon apples are already on their way to China, having been shipped to the Orient some time ago by Kelley Bros., a Hood River apple-buying firm.

The early fall rains did great damage to the Oregon prune crop, according to a report on the situation made by the Oregonian, which says that, allowing for exaggerations in reports, which are usual when a crop is in danger or injured, prune men nevertheless believe that this year's crop has been cut down one-half. If this is true it will mean a loss of about \$3,000,000 to the prune growers of Oregon.

There were prospects in the spring of a crop of 80,000,000 pounds of dried prunes in the state. The estimate was cut down to 60,000,000 pounds when the June drop came and now the rain damage has reduced the crop probably to 30,000,000 pounds.

Discovery of a hybrid prune, the "New Oregon," which experts declare will revolutionize prune growing in the entire northwest, was announced at a banquet of prominent Oregon nursery men recently, says the Oregonian.

The prune was first discovered about eight years ago in an orchard owned by Andrew Vercler in Polk county. Following a series of careful experiments with a few specimens produced during a period of several years, Mr. Vercler top grafted an entire row across another Polk county orchard, and also a portion of an orchard which he owned near Hayesville. The top grafting came into full bearing last year and the prune, it is stated, has been commercially tested in every way.

The "New Oregon," authorities state, has been tested as to texture, sugar, acidity, content, drying proclivities and carrying quality of the tree, and in each case has been found far superior to anything previously grown in the northwest.

In appearance the new type of fruit would seem to be a cross between the Oregon "Italian" prune, and the Oregon "French" prune. It is larger than either, however, and more tasteful.

WASHINGTON

The Yakima valley pear crop is estimated at about 800 carloads, a large part of which went to the canneries. Prices are reported to have ranged from \$65 to \$90 per ton, the top price being paid for unusually fancy fruit.

The first cars of green prunes shipped from the Walla Walla district this year are reported to have brought around \$50 per ton. The first sales from this district last year were over \$100 a ton. According to an estimate made by District Horticulturist E. G. Wood, the prune crop at Walla Walla was cut down from 50 to 75 cars by the depredations of the red spider.

The Wenatchee World reports the most successful Bartlett pear season in the history of the district. The shipment amounted to about 500 cars at prices from \$65 to \$80 a ton. Late varieties of pears from this district made added shipments of around 200 cars.

After having spent several years as the manager of a large fruit ranch near Wapato, William Jonson announces that he will give up fruit growing to devote his time to the manu-

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facture of a combination spray, which he claims will kill any and all insect pests that infest an orchard. The plant, it is understood, will be located at Wapato.

The second annual prune harvest festival of the Prunarians, an organization which represents in a civic way the large prune-growing activity in Clarke county, was held during the middle of September at Vancouver, and attracted widespread attention on the part of prune men and others interested in fruit in Washington and Oregon. Besides a program of entertainment each day, visits were made to the prune orchards and packing plants and general methods of prune culture informally discussed.

E. M. Seifert, of the United States bureau of markets, has opened offices at 424 Federal building, Spokane, following the decision of the government to close the Portland office and make Spokane the center for reporting apple and potato crop conditions in the North-

west. "From the Spokane office we shall issue a daily report on the apple and potato crop conditions in the four Northwestern states," said Mr. Seifert.

Yakima growers who desired to dispose of windfall apples met with the sudden realization that the cull apple crop, which a year ago brought a revenue of close to \$500,000, will this year be a drug on the market, according to a recent report. No buyers are willing to take windfalls but it is understood that later in the season the cannery will be willing to take some for making apple butter.

A campaign to combat the codling moth and the leaf roller insect in the Spokane valley fruit sections and other parts of Spokane county will be made under the direction of E. J. Kelley, deputy state horticulture inspector for northeastern Washington in the near future. Fruit growers of the sections have met with Mr. Kelley to work out a plan whereby aid will be asked. Several inspectors for

Spokane county alone will be appointed about January 1st if the present plans of the campaign go through.

Yakima shippers, as a result of efforts of the commercial club, have contracted for all refrigerated space aboard the Hamburg-American steamer Kinderdyke, providing water transportation to Europe for 31,000 boxes of apples, or approximately ten carloads. The freight will be \$47,600 or \$1.40 a box from a Puget Sound port through the Panama canal to London, Antwerp or Rotterdam, as consigned. The trip will take 14 days, approximately, but is considered safer as well as being 10 cents a box cheaper than to take the fruit across the continent with the present congestion in New York harbor.

Several cars of mixed varieties of apples have been shipped to Alaska from Hanford in the lower Yakima valley. Several more will be forwarded to Seattle for shipment north.

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Controls { Pear Psylla Fire Blight Scale

SCALECIDE controls Pear Psylla, when applied in the Fall, by killing the adults before they lay their eggs. (After they lay their eggs in the Spring it is too late.) Scalecide also controls fire blight by penetrating the diseased tissues and killing the hold-over canker from which fire blight is spread. It is not only a contact insecticide for scale, but has fungicidal and germicidal properties too.

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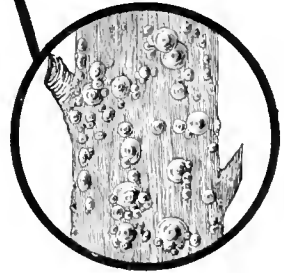
the saving of material and labor. One barrel of Scalecide, making 800 gallons of spray, will cover, until they drip, as many trees as three and a half barrels of lime-sulfur, which make 1600 gallons of spray. And of course you can apply 800 gallons of Scalecide in much less time than 1600 gallons of lime-sulfur.

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Scalecide is soothing and antiseptic to the skin; it does not injure even the eyes; it is non-poisonous to man or beast; and being an oil, it makes the pump run easier and does not clog the spray nozzle. *It is a pleasure to use it!*

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The past year many fruit growers were disappointed because they could not get Scalecide. This year, though we have doubled our factory capacity, we anticipate difficulty in meeting the demand. Order early and avoid disappointment. Write today for our free booklet, guarantee and prices, and give us your dealer's name. Use the coupon below. Address Dep't 25.



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Name.....(Name).....P. O.(P. O.).....State.....(State) 25



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CALIFORNIA IRON WORKS

RIVERSIDE, CALIFORNIA

Apple sales in the various districts in Washington as well as the other sections of the Northwest are reported to be slow with very little indications as to prices. A few sales have been reported from the Yakima, Wenatchee and Spokane districts, but the general trend is to hold off until later in the season. A sale reported by the Spokane Valley Growers' Union of 50 cars shows a drop in prices for the same varieties of 25 to 75 cents a box compared with those of last year. The prices quoted for the Spokane Valley are \$2.00 to \$2.25 for Jonathans; \$2.25 to \$2.75 for Delicious; and \$2.25 to \$2.50 for fancy Winter Bananas. The following prices for extra fancy grades are reported to have been offered by buyers at Wenatchee: Winter Banana, \$2.75; King David, \$2.15; Jonathan, \$2.00; Delicious, \$2.00. Growers are somewhat disappointed with the prices of Delicious and Jonathan, believing that there is a shortage of both varieties.

The heavy rains during September very materially cut down the output of the prune crop in Clarke county, prune men there estimating that from one-third to one-half of the crop is a loss.

Bits About Fruit, Fruitmen and Fruitgrowers

E. F. Benson, commissioner of agriculture of the state of Washington for several years, recently resigned this position and accepted one as manager of a new department that has been created by the Northwestern Pacific Railroad. The new department will be known as that of immigration and industry, through which the railroad plans to co-operate with federal and state authorities, agriculturists, county agents, farm bureau organizations, county agents, farmers' clubs and other agencies in promoting enterprises for the Northwest. In making the appointment, President Hannaford of the Northern Pacific stated that Mr. Benson had been selected owing to his experience with agriculture and the railroad business. Mr. Benson accepted the position by cable from Shanghai, China, having been away for several months on a trip to the Orient. He took charge of his new duties October 1st and will have his headquarters at St. Paul.

A visitor in the Northwest at the present time is Mr. Sam Birch, representative of T. J. Poupart, one of the largest handlers of fruit and produce in London, England. The mission of Mr. Birch in the United States is to secure shipments of American apples. Mr. Birch, who has been touring Washington, Oregon and California, believes that notwithstanding the price control in England that the fancy and choice grades of Northwestern box apples will bring the grower better returns in England than in this country and is endeavoring to make arrangements for large shipments of these grades, particularly Newtowns. Owing to the almost total failure of the English apple crop and the short crop in Canada, Mr. Birch looks on the coming season for the export of American apples with an optimistic rather than a pessimistic eye, and for this reason his firm is sending him into America for the first time to enlarge its export business. The Poupart company, which has one of the largest fruit and produce warehouses in England, has connected with its firm men who have long been identified with handling fruits on a big scale, and recently secured the services of W. H. Press, who, during the war, had sole charge of supplying the English army and navy canteen departments with fruit and produce. Although Mr. Birch has established his headquarters during the apple shipping season at Vernon, B. C., he will make frequent trips into the Northwest section of this country.

According to a statement made to the Hood River Glacier by C. W. McCullagh, sales manager of the Hood River Apple Growers' Association, who recently returned from an Eastern trip, any pronounced activity in the box apple trade will probably hold off until around the holidays. Mr. McCullagh says that the big Eastern districts will produce 65 per cent more apples than last year, a big percentage of which will have to be gotten out of the way before the market opens in a large way for box apples. He believes, however, that the better storage facilities provided and the superior keeping and other qualities of apples from this section will later allow the Northwest apple crop to clean up in good shape.

Far from satisfied with the recent increase in freight rates on fruit shipments from the Pacific Northwest, both citrus and deciduous fruitmen, it is stated, will continue the fight against the new rates. Data to show that the increase is discriminatory and will seriously handicap the fruit-growing industry on the coast is now being prepared and will be presented to the Interstate Commerce Commission in the near future. It is pointed out that a box of oranges from California, when shipped to New York, will be required to pay approximately a freight charge of \$2.00, and that

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a box of apples of half the weight a proportionate increase. This means that the fruit must be sold to the consumer at such an increased figure in order to insure the grower a reasonable profit that fruitmen believe that the Northwest fruit industry will be seriously injured.

The maximum control prices on apples, which will go into effect on November 15th in England, is as follows: Home-grown apples, first owners' price, 63 shillings per hundredweight; imported apples, first owners' price, Nova Scotia, 62 shillings per barrel; Canadian, Maine, Virginian and Western States, 68 shillings per barrel; British Columbia, Washington, Californian, Oregon and Australasian, 21 shillings 6 pence per case of not less than 37 pounds; British Columbian, Washington, Californian, Oregon and Australasian, 23 shillings 6 pence per case of not less than 40 pounds. Any variety of imported apples, 60 shillings per hundredweight.

Ridley & Houlding, of London, England, who have made a specialty of handling box apples from the Northwest for several years, are again in the field this year, and with other English importers are reaching out for increased tonnage. This firm, which handles apples from any part of the globe where they are grown, has recently issued an attractive booklet showing views of the salesrooms. In one of these views is shown a room with large piles of box apples being offered to the trade. In contrast to this, on the opposite page, is a picture of the domestic apple handling room, where the apples are packed in basket hampers. These hampers, which are round with a flat top and bottom, have a lid attached, and when emptied by the retailer, are returned to the jobber, who has his name painted on them in big letters. Other views in the booklet contain pictures of the private offices of Mr. Ridley and Mr. Houlding at their desks, the accounting room and other sections of the big establishment.

The Eastern cranberry crop will bring \$10.00 per barrel this year, according to Cape Cod, Mass., growers who figure that the additional cost of labor and containers make it necessary for them to bring this price. At this figure Pacific Coast cranberry men are expecting a price fully in proportion to that of the Eastern berry.

What They Are Doing in California

Desiring to make unassailable their position as a strictly legitimate non-profit co-operative growers' selling organization, and in an attempt to comply in every way with the spirit as well as the letter of both Federal and State laws governing growers' co-operative marketing associations, the Board of Directors and Trustees of the California Prune and Apricot Growers, Inc., voted recently to change the form of their organization from a corporation to a non-capital stock association.

Reorganization of the California Prune and Apricot Growers, Inc., along these lines will, according to a statement issued by the association, be begun immediately by altering the form of contract now signed by the growers when they join the association. The reorganization will be completed by 1922, when all of the present contracts held by the association with its 10,000 grower members expire.

H. G. Coykendall, General Manager of the association, says that the reorganization plans voted by the California Prune and Apricot Growers, Inc., were in no way influenced by the suit filed in Los Angeles by the Federal Trade Commission asking for the dissolution of the California Associated Raisin Company on the grounds that it was a monopoly in violation of the Sherman anti-trust law.

Coykendall explained that the changes to be made by the California Prune and Apricot Growers, Inc., were the result of a series of informal conferences held between the representatives of the association and the Federal Trade Commission. At these meetings, which began last February and have extended over the intervening seven months, Coykendall said there was a frank and open discussion as

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to just what the purposes and objects of growers co-operative associations should be.

At the conclusion of these conferences a few weeks ago the Federal Trade Commission had no suggestions to make for reorganization of the prune growers' association, and Coykendall emphasized that the changes voted were entirely voluntary on the part of the association.

In the statement issued by the California Prune and Apricot Growers, Inc., it was said that the Federal Trade Commission always had no suggestions to make for reorganization could not in any sense be looked upon as a monopoly because of the already large and steadily increasing Oregon and Washington prune productions.

Justifying the commission's attitude, it was pointed out that the Oregon and Washington prune crop, under normal conditions, totals approximately 80,000,000 pounds as compared with an estimated California yield of about 175,000,000 pounds. Of the combined production of 255,000,000 pounds, the California Prune Growers' Inc., markets less than one-half.

Cannery Notes

As an aid to increased financing of canning operations, the plan of issuing warehouse receipts by a duly incorporated warehouse company is being suggested. This plan is proposed after the legal requirements in each state are passed upon. If there is no obstacle in the way, the procedure suggested is, after packing begins and the finished product commences to accumulate, to issue negotiable warehouse receipts, which the canner may present to local banks as collateral.

As a result of the campaign of the National Canners' Association for a rigid inspection of all canned goods, canned foods are said to be making their appearance on the market bearing the sanitary inspection seal. As the use of the seal went into effect this season, its appearance on grocers' shelves so soon is called attention to as showing the rapid distribution of the new canned goods crop.

The announcement is made that Atlantic City, N. J., has been chosen as the meeting place for the fourteenth annual convention of the National Canners' Association. The dates will be January 17 to 21, next. The canners of the country gave serious consideration to holding their convention on the west coast, but decided not to do so owing to the increase in railroad rates and traveling expenses.

Residents of Warren, Oregon, are reported to be planting many acres of loganberries in anticipation of the erection of a plant there capable of handling 100 acres of fruit. Capital sufficient for a plant to be built either at Warren or Houlton is said to be assured.

J. M. Lane, manager of the Idaho Canneries, Inc., of Payette, who recently returned from the East, reports the sale of the entire output

of the plant for this year. In Chicago alone he sold 5,000 pounds of apple butter. The cannery also recently sold 80,000 pounds of cherries to a Denver firm.

The new cannery at Orville, Wash., is reported to have closed the largest contract for canned goods ever made in North Central Washington. The contract consists of the delivery of 2,000 tons of tomatoes, which it is putting up from a large acreage in the West Okanogan district.

Notwithstanding the shortage of pears, G. B. Kile, superintendent of the Libby, McNeil & Libby cannery at Yakima, Wash., states that before the close of the season he expects that the tonnage of pears put up will equal that of last year.

One of the largest central warehouses in the Northwest for storage of canned fruits and vegetables has just been completed for A. Rupert & Co., Inc., in Portland, Ore. Operators of eight big canneries in Oregon and Washington. The new structure, which is of brick, is capable of handling 100,000 cases of fruit. Operation has already begun in the newest of the Rupert plants, recently finished at Newberg.

What is believed to be the largest prune drier in the Northwest is now in operation at West Salem, Oregon. The plant is 100x200 feet in dimensions and has a capacity of 2,000 barrels of prunes a day.

Between their two plants at The Dalles and Salem, Oregon, the Kings' Food Products Company will process a large tonnage of prunes this year. The Dalles plant will secure all the prunes to be had in that district and at Mosier, and in addition pack out 500 tons from the Willamette valley. The two plants, it is stated, will handle 1,400 tons of the green fruit.

Between 10,000 and 12,000 cans of beans a day was put up by the cannery at Cœur d'Alene, Idaho. The plant also put up large quantities of tomatoes. It will finish the season with apples.

Nine acres of ground will be covered by the factory of the American Can Company, now under construction in North Portland. It is to cost \$1,500,000 and will have a capacity of 100,000,000 fruit and salmon cans annually and about 50,000,000 specially designed containers for coffee, spices and the like. In the plant will be a complete lithographing shop for production of high-class labels.

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OF THE ROCKY MOUNTAINS

Propagation of Apple Trees, Etc.

Continued from page 5.

the nursery as Bough. Furthermore, observations made on digging the trees fail to discover any noticeable correlation between vigor and rooting. It has seemed to the writer that a small, weak tree was as likely to be rooted from the scion as a strong one.

Some varieties branch more freely than others. During the season of 1916 a block of yearling whips branched quite freely from the newly formed axillary buds. Notes taken at the time are as follows: No branches, Northern Spy; few, Baldwin, Bough, Oldenburg, Tolman; all, Transcendent (Crab). This gives no indication of any correlation between rooting from the scion and branch growth from axillary buds. A more reasonable expectation might be for a correlation between root formation and branching from adventitious buds on the stem. No exact record of branching from adventitious buds is available, but limited general observation of the behavior of budded trees leads the writer to believe that such a correlation may exist, and that Bough and other free rooting varieties do send out shoots from adventitious buds more freely than Tolman and other varieties that root only sparingly. Further and more definite records may prove or disprove this belief.

The relation of callus formation in cuttings has been referred to. Unfortunately no full notes of callus formation on the cuttings set was kept, but it is suggestive to point out that Yellow Transparent, which uniformly gave as large a callus as any variety, did not root as well as Wagener, which never gave any sign of callus formation.

Neither can we discover any relationship between rooting from the scion and season of maturity, either of fruit or wood, nor in size of leaves or density of foliage.

Many woody plants are propagated from cuttings, and in general it is those with soft wood that grow most readily. There is considerable variation in hardness of wood among different varieties of apples, and we may inquire if those with softer woods are the ones that root most readily from the scion. No extended investigation of this question has been made at this station. Beach and Allen made extensive tests of the hardness of wood of different varieties. They found considerable difference within the variety, and a clear comparison of their results with rooting ability, as shown by their investigation, is difficult, but a general survey of their results leads to a belief that there is a general correlation. It is, however, subject to exceptions. Beach and Allen of the Iowa Experiment Station came to the conclusion that there was a correlation between hardness of wood and resistance to winter cold, and here again there seems to be a rather loose correlation with rooting ability. Oldenburg and Wealthy are very hardy and root poorly, and Bough is tender and roots well. But Ben Davis is quite hardy and roots comparatively well, and Hubbardston and Tolman are less

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hardy than Wealthy and do not root so well.

Wide variations in the rooting ability of different lots of the same variety are evident. Some of these are clearly seasonal. Such differences may be due to climatic conditions, to soil conditions—for the soils used in different years are not all alike—or they may be due to difference in the scions used. Any such difference would most likely trace back to the growing conditions the previous season as affecting stored food and possibly structure. Slight differences in cultural treatment may have had an effect. Varying rainfall may have had an influence. It is impossible from the evidence at hand to determine which of these possible factors have had an influence and to what extent.

Summary

1. Stem cuttings of the common apple grow only rarely; in the trials here reported none succeeded, though callus formation in some varieties was good.

2. Root cuttings grew well, especially when young roots were used, though growth was slow the first season.

3. Limited tests indicated that most varieties may be readily propagated by mound layers.

4. The best means of establishing trees on known roots is by the nurse-root method. The scion is whip-grafted on a short piece of root and planted deeply; at the end of one or two seasons' growth the tree is dug, the seedling root removed and the tree replanted. Neither dwarf apple nor pear roots are of value as nurse roots.

5. Varieties vary greatly in the readiness with which they send out roots from the scion, the proportion varying from none to practically all with different varieties.

6. There is also great variation within the variety in the numbers rooting from the scion.

7. Varietal differences may be loosely correlated with density of the wood, the softer the wood the higher the proportion rooting from the scion.

8. A fertile, well drained, sandy loam probably offers the best conditions for securing a high percentage of rooting trees.

9. Once trees are established on known roots they may be propagated by root cuttings or by root grafting on known roots.

10. There seems to be a relation between the varietal ability to produce roots from the scion and the thickness of the cambium layer at the dormant season.

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Utilizing the Fruit Crop of the Northwest

Continued from page 7.

manner the process of abstraction does not injure the cellular structure of the commodity treated. His first successful demonstration was made in Australia in 1886. This antedates the work done in Continental Europe, that the U. S. Department of Agriculture has given as the origin of dehydration. Mr. Spawn claims to be the originator of dehydration. This man has operated on three continents and now has a headquarters plants in Seattle. The writer, however, could not find that he has anywhere now a commercial plant in actual operation.

The Northwest Company has a commercial plant in operation at Cashmere, Wash., that is giving special attention to cooking apples. The most important concern now operating in the Northwest, the writer found to be the King's Products Company of Portland. Two large plants are in operation. One at Salem and the other at The Dalles, Ore. This company is well financed and has under contemplation the establishment of a third branch plant. Its products cover a multitude of fruits and vegetables.

By-Products Plants of the Northwest.

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Yakima. Situated as it is, in the largest fruit district of the whole Northwest, this plant has turned into economic value what would otherwise have gone to waste. Burlington, Wash., has a canning plant that cans certain tree and bush fruits, turning out 400 cases per day during the canning season. Bellingham, Seattle, Vancouver and other fruit centers in Washington, have valuable by-products plants of commercial and economic importance.

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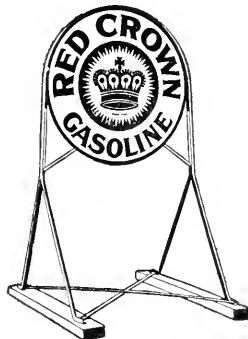
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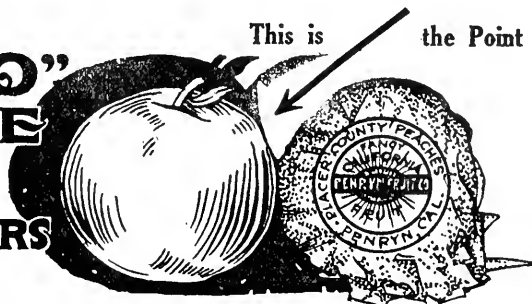
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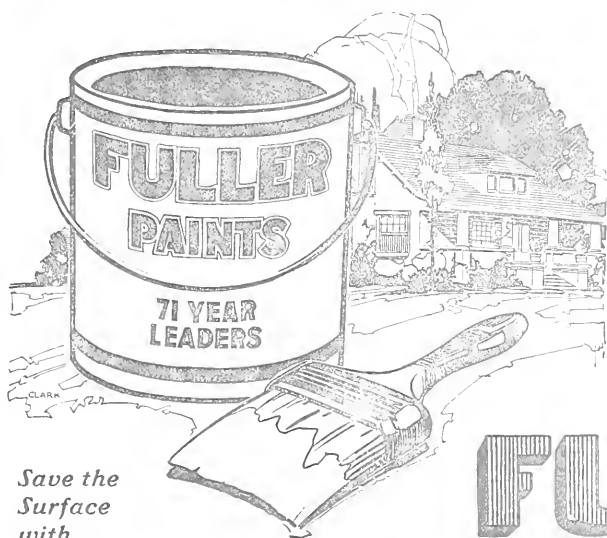
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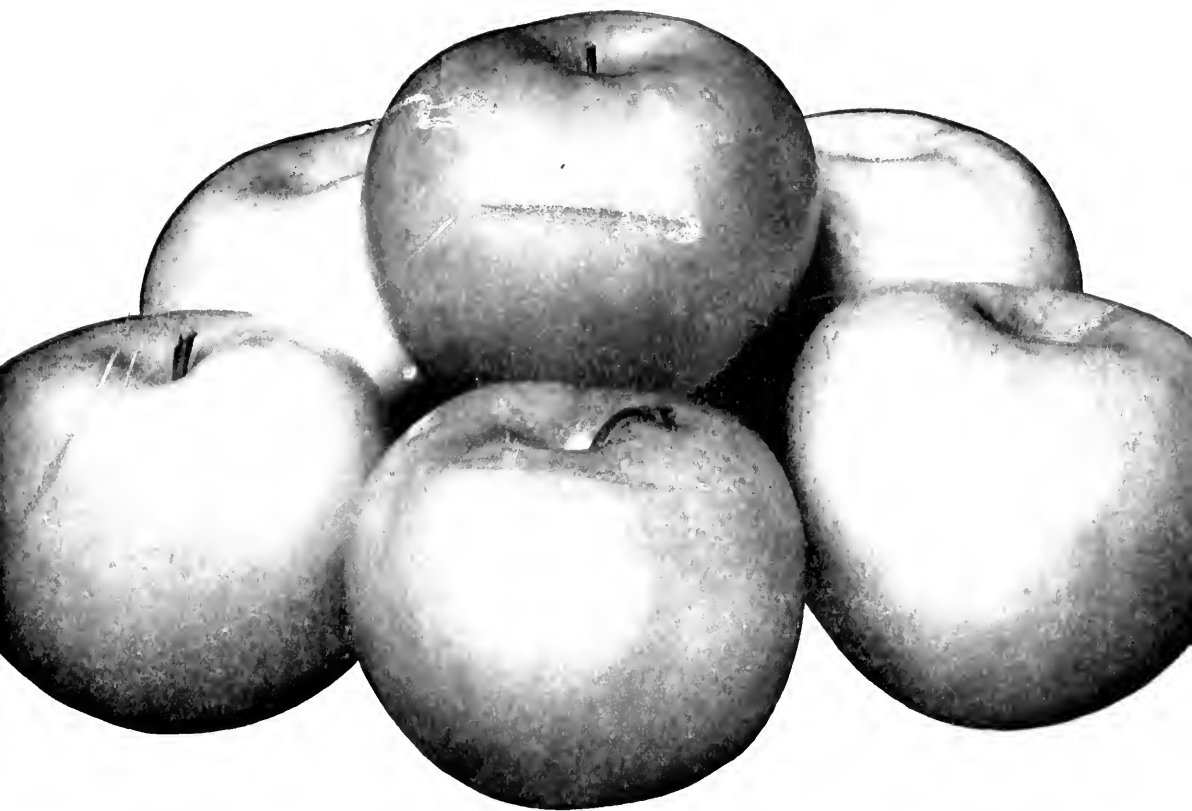
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VOLUME XV

NOVEMBER, 1920

NUMBER 5

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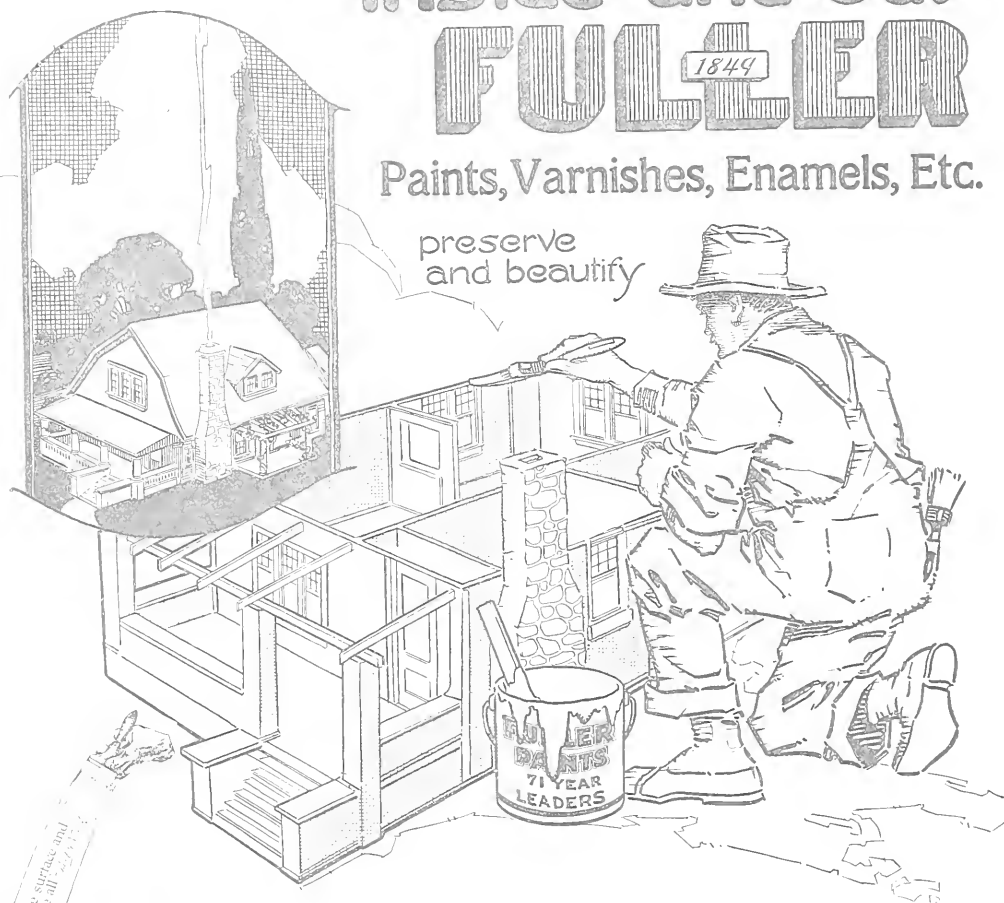
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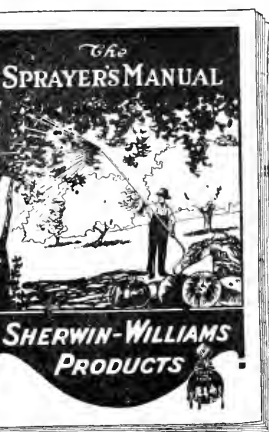
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and Marketing.

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VOLUME XV

PORTLAND, OREGON, NOVEMBER, 1920

NUMBER 5

Codling Moth Control in British Columbia

By R. C. Treherne, Entomologist in Charge for B. C. Dominion Department of Agriculture, and
H. H. Evans, District Field Inspector, Provincial Department of Agriculture

THE great object that Department of Agriculture officials, both Federal and Provincial, in British Columbia have always carried before them in handling the codling moth situation is the eradication of incipient outbreaks. In a broad aspect the work may be divided into two channels. (1) The control, by eradication methods, of incipient centers of infestation. (2) The prevention of the importation of the moth by infested railway fruit cars. The life history studies of the moth may also be considered a third aspect of the work confronting those engaged in the control operations in British Columbia, but inasmuch as this work is undertaken only to a point where the information gathered would assist in the control operations, this phase may be considered only as an accessory motive to the eradication procedures. Fortunately, in British Columbia, while several of the so-called "incipient" outbreaks have been prolonged over a period of from six to ten years, we still consider that the moth is not an established pest. Certainly it is a fact that the codling moth is not yet a matter of concern to the fruit growers as a whole on their individual holdings. The basis for this satisfactory state of affairs was established several years ago by former officials of the Department of Agriculture who realized the hold this moth was capable of obtaining in apple and pear raising districts and who instituted measures to prevent its spread. The present executives now engaged in the control operations can only be said to have continued the work previously laid down, and to have perfected the system by educational and field operations. We do not, for a moment, wish the idea to go abroad that British Columbia has devised any new or startling method of control. We have merely realized the serious loss this insect is capable of causing, drawing our opinions from observations gathered from apple raising sections of the United States and Eastern Canada, and having a full realization of the possibilities, have adopted measures before the insect had a chance to become established. We are under a great debt of gratitude to our friends in the Northwestern United States who have freely

supplied us with information on this insect, particularly as regards losses occasioned in the orchard and life history records. Our life history notes, in British Columbia, are by no means perfect owing to the paucity of material available for study and to the dangers of breeding the moth in areas which are either not infested or where eradication measures are in operation. In return for the information that we have obtained by direct and indirect means from the Northwestern United States we are very willing to supply any entomologist, field inspector or orchard section with information gathered from our work, both as regards modes of operation and costs, in the belief that while infestations of long standing are difficult to handle, young orchard sections may find the information of great value.

Outbreaks of Codling Moth. Fourteen distinct and separate outbreaks have occurred in British Columbia since 1905. Today only one serious center of infestation is known to be present and that occurs in the interior sections of the province. Larvae have been taken and occur, at this time, at one or two coastal points, but their presence does not occasion much worry, inasmuch as the humidity and temperature records are not suitable for a rapid multiplication of the insect. Our greatest concern is the dry interior, where temperature conditions are eminently suited to a rapid and productive multiplication of the insect, but, as we have said, only one center of infestation now occurs in this section. As may be supposed, conditions best suited to the moth are also best suited for tree fruit production for it is in the dry sections of the interior that our best tree fruit sections are located. Approximately 40,000 codling moth larvae have been destroyed in British Columbia since 1908, the great majority being taken in the Okanagan Valley. The greatest number taken in the Okanagan Valley in a single year totalled nearly 10,000 (1915). This number has been reduced to such an extent by vigorous eradication measures that in 1919, last year, only 337 larvae were taken, and of this number we feel morally certain that 150 resulted from a new migration

from infested railway cars during the year. During 1920 until the close of September only 40 larvae have been taken in the infested area in the Okanagan Valley.

We are, therefore, able to state that the codling moth may be eradicated, given the proper measures, and the full co-operation of the growers.

Life History Records. As stated before, life history records have been kept simply to ascertain the correct dates for spraying. We do not claim to have obtained a full and complete statement of the bionomics of the moth. Such records as we do possess are limited by the extra careful and to some extent unnatural methods of breeding.

In general, it may be stated that two complete broods usually occur, although our laboratory records do show that a single generation is not uncommon.

1916. The winter of 1915-16 was an exceptionally severe one and all codling moth larvae wintering above snowline were killed. It was observed that with smooth bark young apple trees the majority of the larvae spun up at ground level or in the soil nearby. The survivors from the winter arose from these larvae. In old trees with corrugated bark the mortality was very high. (Note — This indicates that in young orchard sections the value of the control operations by banding and band examinations is somewhat curtailed and made more difficult.) The spring opened favorably but was cool, and the blossoming period of apples took place from the first to the middle of May, and calyx spraying operations occurred from the middle to the end of that month. Codling moth adults were flying during the first two weeks of June until late in July, and full grown larvae were taken on July 11. Larvae commenced to leave the fruit about July 18. Adults bred from pupae collected in the field commenced flying on August 1, although a slight emergence took place on July 25. This was the start of the second generation, with larvae of this generation present from mid-August until Autumn. Out of 116 larvae, whose histories were correctly recorded this year, 73 per cent were

single brooded. Second generation eggs were being deposited in the field from August 1 up to September. Moths continued to emerge under insectary conditions until October 4. With the limiting factor of the effectiveness of the calyx spray for controlling "calyx entry worms" field records showed that 80 per cent of the spring generation of larvae entered through the side of the apple, 8 per cent calyx and 12 per cent stem entry.

1917. The winter of 1916-17 was colder than normal, and again we find a heavy mortality due to low temperatures, winter mortality being registered as 84 per cent. Larval material collected in the autumn of 1916 was carried over the winter in burlap bands around a tree, two feet from the ground level and in ground cages. Some larvae were carried over winter in glass cylinders, which were open at each end and plugged with cotton wool and also in folds of corrugated cardboard. The only larvae that survived the winter, reaching the adult state, in due course were those that were held in ground-level cages. In one locality some of these cages became flooded early in April by melting snow and remained immersed in water for the best part of three weeks, and the larvae contained in them survived, while others, which were subject to the varying spring temperatures above ground succumbed. At the time this note was taken it was remarked that flooding orchards in the early spring would be favorable to the development of the larvae. The mortality of over-wintering larvae has been noted by many writers on the codling moth and notes have been taken showing that the range may vary from 5 per cent to 81 per cent, according to the locality and the year. In 1917 over-wintering larvae commenced to form pupae on May 24 and continued until well into June. The spring generation of moths started to emerge on June 20 and continued emerging during July. The season was backward and calyx spraying was in progress between June 1 and 13, just following the blossoming period of apples. Eggs, from our observations, were laid between June 29 and July 3, incubation lasting from ten to seventeen days. The first generation larvae that were observed in the field were found on June 29, and they became full grown on July 15. Pupation of the first generation commenced in the field about July 21. Every larvae (94) under observation this year formed pupa and appeared later as a moth. Hence no records are available to show that any portion of the generation was single brooded, although it may be stated with a fair degree of certainty that practically all were double brooded this year. Second generation larvae were in evidence in the fruit on August 10, having commenced to appear around the first of the month. The remarkable differences in this year's records are worth noting. The spring opened late, producing a delayed flight of moths, but the early summer was very warm and



View of Orchard Section in the Okanagan Valley near Vernon B. C.

dry so that conditions were more than equalized.

1918. The blossoming period of apples in the Vernon section occurred during the closing days of April this year and calyx spraying was in progress on May 10. The number of over-wintering larvae this year, which were held under observation, was very few; the mortality, however, due to winter, was less than that which occurred in 1917 or 1916. Owing to the transfer of our insectary this year some material was interfered with to such an extent that a very imperfect statement can be made as to the actual mortality due to winter. It was judged, however, to be less than 40 per cent. The first spring brood of moths appeared under insectary conditions during the first two weeks of June, but doubtless moths were flying in the field during May and until July, judging from the size of the larvae taken in the fruit in the quarantined orchards. Here again, as in 1917, the great majority of the larvae of the first brood preserved to form the second generation, and moths of the latter generation, were freely appearing from July 24 onward.

1919. The blossoming period of apples was late this year and the first calyx sprays were being applied between May 27 and June 7. Moths of the spring generation were flying late in June and full grown larvae were present and leaving the fruit on July 22. The percentage of the larvae, from cage specimens, that proved to be single brooded this year, was about 20 per cent. Of the remainder, moths appeared on August 7 and continued emerging until late in September. Minute second generation larvae were present in the field in fruit on August 10.

1920. During this present year the spring moth emergence continued from June 3 to 30. The blossoming period of apples took place between May 10 and June 1, and calyx spraying opera-

tions were in order between May 28 and June 13. First cover spray, June 26 to July 6. Second cover spray, August 6 to 20.

Summary of Life History With Spray Dates—1916.

Apple blossoming date, May 1-15.
Calyx spray date, May 15-30.
Flight spring moths, June 7-July 30.
Larvae full grown (1st brood) July 18.
Flight summer moths, August 1.
Second brood larvae entering apples, August 15.

1917.

Apple blossoming date, May 10-30.
Calyx spray date, June 1-13.
Flight spring moths, June 20-July 15.
Larvae full grown (1st brood) July 15.
Flight summer moths, July 25.
Second brood larvae entering apples, August 1.

Cover spray date, June 28-July 9.
Third spray date, August 3-13.

Band examinations—

- (1) July 19-30.
- (2) August 2-19.
- (3) August 28-September 12.
- (4) September 17-22.
- (5) September 24-29.
- (6) October 5-9.
- (7) October 10-15.
- (8) November 10-22.

1918.

Apple blossoming date, April 29-May 7.
Calyx spray date, May 10-25.
Flight spring moths, May 25-July 1.
Larvae full grown (1st brood) July 15.
Flight summer moths, July 21-August 8.

Second brood larvae entering apples, August 1.

Cover spray dates, June 23-29.

Band examinations—

- (1) July 2-15.
- (2) July 17-30.
- (3) August 5-12.
- (4) August 18-September 4.
- (5) September 27-October 3.
- (6) November 6-20.

1919.

Apple blossoming date, May 9-25.

Calyx spray date, May 27-June 7.

Flight spring moths, June 25.

Larvae full grown (1st brood) July 22.

Flight summer moths, August 7-September 15.

Second brood larvae entering apples, August 10.

Cover spray dates, June 30-July 11.

Third spray date, August 19-26.

Band examinations—

(1) July 4-9.

(2) July 30-August 9.

(3) August 11-20.

(4) August 25 to September 15.

(5) September 20 to October 6.

(6) October 27 to November 17.

Orchard Operations in Infested Areas.

Just as soon as the presence of larvae of the codling moth is realized in any given orchard section, all trees are at once banded. Usually records of new infested areas become known in the autumn or late summer. All that remains to be done, therefore, in the autumn of the year is to examine the burlap bands and to closely supervise the picking and packing operations. The following spring a quarantine area is established and the following procedure is undergone:

(1) All trees are banded.

(2) Periodical inspections are given the bands and main tree trunks commencing in April for over-wintering larvae, and from early June onward, as many times as possible, but at least six times before November 15.

(3) Windfalls from July onward are destroyed when possible.

(4) Two or three spray applications commencing with the calyx spray are given. (Calyx, first cover, June 25-July 5; second cover, August 1-10.)

(5) All root sucker growth, loose bark and dead wood is removed.

(6) Old neglected trees are pruned back to accommodate the spraying operations.

(7) Under certain conditions all fruit is removed from the trees before the end of June, but the trees are sprayed and banded in the usual manner.

Fruit Disposal in Infested Area. The present method of handling an area infested with codling moth is somewhat as follows:

(1) A quarantine area is formed with an allowance made for treatment of a contiguous area not necessarily infested.

(2) All apple and pear fruit is closely inspected before shipment, and inspectors are notified when shipments are intended.

(3) All fruit is packed in the infested area, no fruit being allowed to be handled in a packing house through which fruit from a non-infested area is passed.

(4) All orchard boxes used in quarantine area must remain in such area unless passed by an inspector.

(5) All fruit in infested areas is loaded into railway cars by the most direct route, and no such fruit is al-

lowed to be sold in the Province or for export from Canada.

(6) Loose or unpacked fruit must not be removed from a quarantined area without permission, and no fruit may be stored in cellars or houses without proper inspection.

(7) Cull fruits must be at once made use of or be destroyed.

Division of Labor. In the years gone by and at present all areas in the Province of British Columbia infested with the codling moth have been and are still under Government control. The necessary operations are undertaken according to the foregoing policies. In consequence of which the Provincial Department of Agriculture stands responsible for part of the cost. In broad outline the Federal Entomological Branch reviews the life history and the Provincial Horticultural Department handles the field control in co-operation with the growers affected.

The plan that has been effected is as follows:

The Provincial Department supplies the bands, applies and inspects them providing the necessary labor and appliances for the same; the necessary number of power spraying machines, with gasoline, oil and repairs; an engineer nozzlemans with each spraying outfit, and supplies of arsenate of lead; the labor necessary for the removal of sucker growth, dead bark and superfluous wood within certain limits, and for the removal of fruit from the trees when such procedure is deemed necessary. The Department also stands responsible for the inspection of all fruit within the quarantine area and for the supervision of the railway fruit cars entering orchard districts. The growers supply the necessary teams of horses for the transportation of the spraying machines through the orchards and from one orchard to another; the requisite drivers and extra nozzlemans. They also pick and pack their own fruit and purchase the spraying materials, which are laid down by the Department.

The Cost Per Acre.

Three-year period—1917-18-19.

	To	To
	Dept.	Grower
Banding material	\$.38	.....
Labor, bands, inspection ..	2.39	.....
Repairs, gasoline, oil, etc. .	1.95	.....
Engineer labor	1.90	.....
Arsenate of lead .....	.....	\$ 4.52
Team, labor for spraying ..	.....	5.23
Fruit inspection	2.25	.....
Inspector's salary, 6 mo. .	4.47	.....

Cost per acre

Average cost per tree

Average number trees per acre, 52.

Railway Fruit Cars. In the belief that railroad fruit cars are the principal method of introducing the codling moth into new sections, very careful consideration has been given the method of handling such cars.

The various outbreaks that have occurred in the Province so far have, in the main, been traced to imported fruit cars, which have carried infested fruit at some time during the season and

which are sent into British Columbia empty to receive shipments of local fruits.

Arrangements are made with the agents of the railway companies whereby inspectors are notified when empty railway cars arrive. Immediate inspection is at once made and only certified clean cars are allowed to continue on their way to other orchard sections. Infested cars are iced at once, kept closed and loaded with local fruit, the cars being carefully cleaned and the sweepings burnt. The cost of railway car inspection approximates 50 cents per car.

Steps are being taken now to introduce a system of car disinfection by steam, and preliminary experiments have already been carried on with excellent results, but thus far the scheme has not been put into general practice. As a result of the work of codling moth control in British Columbia we are able to claim that the insect can be eradicated from any given seat of infestation. The most important problem that confronts us, however, is the treatment of cars to prevent reinfestation. We appeal to our friends in the Western United States to do all in their power to maintain a state of car cleanliness for their own good as well as for ours. It should pay handsomely, and with proper control on importations, established centers of infestation may be reasonably handled by departments in co-operation with the growers. This last point cannot be too strongly emphasized—co-operation with the growers. We contend that no reform movement or legislative act is of any avail unless public opinion supports it. We are fortunate, in British Columbia, in that our growers are thoroughly alive to the serious import of the codling moth, and what success we, as Department officials, have had in codling moth eradication is as much due to the hearty co-operation of our local orchardists as to other factors. We cannot bespeak too strongly the importance of this aspect of the problem, and we would leave you with the suggestion that the first and most important phase of the codling moth eradication is the growers' co-operative movement. After that, procedures are comparatively simple.

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Sites and Soils for Small Fruits in the Northwest

By C. I. Lewis

IN CHOOSING the location for a small fruits plantation one has to take many points into consideration. First, there are certain climatic conditions which will determine to a large degree whether certain of our small fruits can be grown to advantage. The rainfall or the possibilities of having an abundance of irrigation water are very important factors. With some of our small fruits the rainfall plays a role which probably even irrigation cannot supplement in all cases owing to the fact that in regions of considerable rainfall the moisture content of the atmosphere at times is apt to be greater than in some of the arid belts. With certain of the cane fruits and brambles it has been demonstrated that they grow to the greatest degree of success on a rich soil abundantly supplied with humus and moisture and an atmosphere which is not too dry.

The winter temperature will, in some cases, be a determinate. Especially is this true where one is attempting to grow the evergreen types like the Evergreen blackberry, Loganberry, Phenomenal, etc. Summer heat also has an influence, at times producing a condition which is unsatisfactory to certain forms but being of distinct advantage to others. The fall temperature, that is, the suddenness with which the growing season terminates, is to be considered where certain more tender forms are grown. The length of the growing season and the altitude also play a very important part. The soil has an important role, especially since some of our cane fruits depend so much upon a cool, moist condition of the soil. Most of our small fruits demand very good drainage. It is evident, then, that soils of this type must be chosen, and in most cases the richer the soil the better.

The response of a plant to natural conditions is shown by an example that we can give of the Evergreen blackberry. Where it is grown wild in Western Washington and Western Oregon, the berries are small, hard and sour, but where it is grown wild in our coast and mountain regions, it is very luscious and hardly seems like the same fruit. It is only by bringing about good conditions, by following good tillage, pruning and feeding that one can produce the Evergreen blackberry to the highest degree of perfection.

In addition to the natural surroundings, I want you to also take into account the possibilities of shipping, and at times the possibilities of using the fruits in the form of by-products. Here on the Pacific Coast we have a tremendous range of climatic conditions, elevations from sea level to the limit of plant growth. We have rainfalls that sometimes range from over one hundred inches to a few inches. Our soils vary from the heaviest of adobe to the lightest of sand, silt, ash and pumice stone. There is such a tremendous range of climate and soil conditions that the problem of small fruit culture

in any one region becomes largely a local one, and in many cases must be solved by local experiments, but after all these tremendous ranges of climatic conditions are of wonderful assistance to us in that they extend our range of crop production and make it possible to grow more types and varieties than would otherwise be possible.

I will mention first some points in the Northwest which we will divide into areas, largely according to climatic conditions. First comes the Western Coast region of Oregon, Washington and British Columbia. This includes the famous Puyallup Valley of Western Washington, in which the Evergreen blackberry and raspberry are grown to the highest degree of perfection. The islands in the Sound, the lower mainland of British Columbia and such counties in Western Oregon as Clatsop, Tillamook, Lincoln and Coos are all included in this class. This region is subject to a fairly heavy rainfall, has a long growing season and quite a range of soils, although the predominant soils are clay loams. In this region the brambles, Loganberries, Raspberries and Blackberries grow to a wonderful degree of perfection. There is probably no section in the United States where such fruits will yield more heavily or grow more vigorously and rank than in this section named. The climatic conditions are such that a tremendous area of these fruits should be planted. Canning factories, evaporators and similar plants should be established in many quarters, while those that are advantageously located as far as shipping points are concerned should ship out large quantities of fruit.

The bench lands of this region produce very good strawberries, and the strawberry under these conditions tends to bear for a longer season, bearing two or three crops. I have picked them abundantly as late as the middle of September. The clay loams, and even some of the tide lands, seem to grow Loganberries and blackberries very nicely. The sandy and silt loams are splendidly adapted to raspberries. Red raspberries, under such conditions, grow very vigorously. I have seen canes ten feet long that have borne fruit to the very ends of the canes and the yields are unusually high. Reports of yields as high as 500 and 600 crates per acre of red raspberries have come from the Puyallup district.

Between the Coast Range and the Cascades there are a number of valleys, especially in Western Oregon, such as the Rogue, Umpqua, and Willamette. The famous Bear Creek bottoms of the Rogue River are ideal for dewberries, raspberries, loganberries, etc. In fact, any class of small fruit thrives well along the river and its tributaries, and a much greater industry should be built up than now exists. Strawberries, of course, can be grown all over the Northwest. In the Umpqua Valley all classes of small fruits succeed. The

region is becoming famous for its very early strawberries, being one of the very earliest regions in the entire Pacific Northwest. The low altitude and the shelter obtained from the mountains result in early maturing. This section should devote more time and energy to early produce of all kinds. In the Willamette Valley certain large sections are developing small fruits. In the Newberg district, on the red hill soils, raspberries, strawberries, blackcaps and loganberries are all thriving. There is a tremendous area of land in the Willamette Valley adapted to small fruits. The sandy and silt soils of the river bottom lands, such as the Mission bottoms at Salem, will produce small fruits of all classes. The yields are very high. At Russellville and vicinity quite a small fruit development has taken place, and in the sandy loams of that region the raspberry thrives especially well. Then we have the inland mountain regions, like Hood River and White Salmon, that have become famous for their strawberries, and while many other small fruits could be successfully grown, the reason they are not grown is that the growers have not attempted to grow them. The strawberry has been the pioneer crop and has been grown until the orchards come into bearing.

In the inland valleys of the Inland Empire small fruit culture at times becomes very profitable. Such regions as Kennewick are early and the stony soils of the Walla Walla Valley are extremely early. They warm up very rapidly in the spring. All along the Columbia River fine strawberry lands can be obtained. In the Payette Valley of Idaho one finds the blackcap being grown successfully under irrigation. There is not a valley in all that wonderful territory but what can grow some form of small fruit to the highest degree of perfection. Gooseberries and currants will be the least successful owing to the fact that both these crops like cool weather and a cool, moist soil. Where dry soils are found and combined with rather dry weather conditions it will be advisable to plant the gooseberry and currant in close proximity to a building, generally on the north side, or, if this is impossible, you could plant them among the fruit trees, where they get some coolness and shade from the trees.

The strawberry has the widest range of adaptability of any fruit we are growing in America. It is being grown from Alaska to Southern California and from Maine to Florida. While it is true that in some of these regions it is necessary to ship the plants in, it being impossible to produce the young plants that will fruit successfully in the region, nevertheless a profitable business is carried on in all these states. In the Pacific Northwest, as far as the strawberry is concerned, it becomes very largely a local problem. There are

Continued on page 17.

The Orchard Leaf Roller—How to Control It

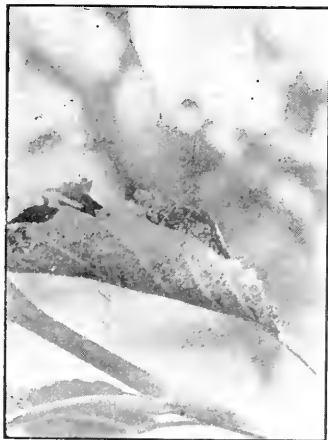
By A. L. Melander, Entomologist State College, Pullman, Washington

WITHOUT attempting to decide whether the chicken or the egg came first, we may say that the leaf roller begins its life cycle in the egg stage during the summer. The eggs are glued in flat masses on the bark of the branches, twigs or trunk, at first, greenish, almost bark-colored, but becoming whitish after hatching. The masses vary in size from an eighth to a quarter inch in diameter and contain

the vital parts of the flowers. This causes the flowers to drop so badly that an infested tree will set no fruit even though it might blossom heavily.

From then until after midsummer the worms can be found, skeletonizing the

leaves, rolling up a leaf here and there, and where abundant completely defoliating the trees. The green worms are very sensitive and when touched wriggle rapidly out of the way or spin their way to the ground on a thread of silk. The pupa is practically naked and placed in the leaf-nests. Moths appear after midsummer, hiding during the day among the trees, but flying actively at



How the Leaf Roller Works.
This insect has gained its name by its habit of curling the leaves.

an average of about forty or fifty eggs. The eggs may remain on the bark for a couple of years, the old ones being recognizable by their color, and by being perforated with the exit-holes where the hatching worms emerge. It is in the egg condition that the leaf roller spends the winter.

When the trees are well in leaf the following spring hatching begins. The worms are at first very small, a sixteenth of an inch long, greenish in color and with a black head. At the time apples blossoms are opening the worms move into the blossoms, usually one to each blossom, and proceed to nibble at



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dusk. The moths are scarcely a half-inch in length and vary in color from almost a sulphur yellow to yellow with brown mottlings. The moths do not lay eggs at once but probably require ten days before reaching maturity. Eggs are deposited on any of the orchard trees, on willows, cottonwoods, roses and probably on any shrub near by.

The leaf roller caterpillars have proved to be remarkably resistant to arsenical sprays. Ordinary arsenate of lead, as applied against the codling worm, has no appreciable effect on them. Spokane Valley fruit growers have been spraying Paris green at the rate of six pounds to the hundred gal-

lons, and have found it partially though not completely effective. This strength of Paris green is the equivalent of using eighteen pounds of arsenate of lead powder to the 300-gallon tank, an amount prohibitive in cost, and in the case of the Paris green so caustic as to irritate the men and horses, making it impossible to retain men on the work. Fumigation is likewise too costly and its effects unknown.

Experiments and orchard practice have demonstrated that the use of a dependable oil spray applied at the end of the winter is the most satisfactory method of controlling this pest. For this purpose a good miscible oil spray

having a heavy body should be used at about 7 or 8 per cent strength. The trees should be completely wetted and not merely sprayed, and the application should be made in good spraying weather. If the spray is too weak, if the application is scant, if wet weather immediately precedes or follows the spraying, effective control cannot be expected. It is not advisable to apply oil sprays until all danger of excessive cold weather is passed. The proper use of oil sprays when the buds are swelling has not been attended by harm to the trees, but the misuse of too strong sprays, or improperly emulsified oil might occasion a set-back. Miscible oil sprays have even been used after trees are coming into leaf, causing a little spray-burning of the foliage, but this injury has been quickly outgrown.

The orchard leaf roller is not a new pest. It has been long known over a wide range, and in Washington I have seen it over a dozen years ago from the Spokane region. The past few years, however, the pest has multiplied to an alarming extent, until now it is decidedly the worst problem many fruit growers are facing. The orchards from Spokane east to the state line are apparently the heaviest infested and scarcely an orchard in the Opportunity-Greenacres-Otis district is free from the moth. Many have lost their crops and even the foliage this year. This insect occurs about Kettle Falls, through much of Spokane County besides Spokane Valley, and also has obtained an alarming foothold near Walla Walla.

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STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912.

of the Better Fruit, published monthly at Portland, Oregon, for October 1, 1920.

State of Oregon, County of Multnomah—Before me, a notary public in and for the state and county aforesaid, personally appeared D. L. Carpenter, who, having been duly sworn according to law, deposes and says that he is the business manager of Better Fruit, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the act of August 24, 1912, embodied in section 435, postal laws and regulations, printed on the reverse of this form, to-wit:

1. That the names and addresses of the publisher, editor, managing editor and business managers are:
Publisher, Better Fruit Publishing Co., Inc., 300 Oregon Building, Portland, Oregon.
Editor, E. E. Faville, 800 Oregonian Building, Portland, Oregon.

Managing editor, none.
Business manager, D. L. Carpenter, 800 Oregonian Building, Portland, Oregon.

2. That the owners are: (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock.)
Owner, Better Fruit Publishing Co., Inc., Portland, Oregon.

Stockholders, D. L. Carpenter, 800 Oregonian Building, Portland, Oregon.
E. E. Faville, 800 Oregonian Building, Portland, Oregon.
A. W. Styles, 800 Oregonian Building, Portland, Oregon.

3. That the known bondholders, mortgages and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner, and this affiant has no reason to believe that any other person, association or corporation has any interest, direct or indirect, in the said stock, bonds or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is: (This information is required from daily publications only.)

D. L. CARPENTER,

Sworn to and subscribed before me this 27th day of September, 1920.

(Seal) Notary Public for Oregon

(My commission expires September 21, 1921.)

Late Developments in Arsenical Insecticides

By R. A. Cooley, Bozeman, Montana

THE old classification of insect pests into those with biting and with sucking mouth parts and the corresponding division of insecticides into stomach poisons and contact poisons are familiar to horticulturists. It is rather generally realized, I believe, that practically all of the stomach poisons used are different forms or compounds of arsenic. Probably nearly all of us remember back to the time when Paris green made its appearance in connection with the control of the Colorado potato beetle, and many will recall an earlier day when we used London purple on potatoes. Since those early days much progress has been made in our knowledge of arsenicals and a number of new poisons have been brought to our attention. I have thought that it would be profitable to discuss and compare the various arsenical insecticides and to mention the underlying principles which should govern the selection of a poison for any particular use, so as to get the best results and at the same time not use one that is more expensive than necessary.

I have made a table of the more important arsenical insecticides which compares them and gives much information in a condensed form.

	Arsenic Oxides	Cost* per lb.	Soluble Arsenic	Sticking Quality	Settling Quality	Texture
Paris green	50%	60c	3.5%	Poor	Rapid	Coarse
Arsenate of Lead	25%	34c	1.50%	Excellent	Slow	Fine
Arsenate of Zinc	10%	26c	.67%	Good	Slow	Fine
Arsenate of Calcium	12.5%	30c	1%	Good	Slow	Fine
Refined White Arsenic	97%	15c		Poor	Rapid	Coarse
Crude White Arsenic	80%	12c		Fair	Medium	Medium

*Wholesale prices in 100-pound lots f.o.b. factory.

There are certain qualities of arsenicals which we need to consider in making a selection. They are: (1) killing power, (2) solubility in water, (3) quality of sticking on the foliage, (4) settling in water, (5) cost.

The killing power of an arsenical insecticide is roughly parallel to the percentage content of actual oxide of arsenic as determined by chemical analysis. By referring to the table you may see the relative strength of the various old and recently discovered poisons, expressed as oxides of arsenic. The comparison of amounts of oxides in the insecticides is to be looked upon as only an approximate indication of the relative killing powers. In this connection it should be stated that the figures for arsenate of lead are for a dry preparation and not a paste. Arsenate of lead paste, which was commonly in use a few years ago, was composed of 50 per cent of water. In the wet paste, therefore, the percentage of arsenious oxide would be only 12½ and the number of pounds to be added to 100 gallons of water for a given purpose would be double as much with the paste as with the dry preparation. It follows, of course, that in order to correctly judge of the relative value of these insecticides it

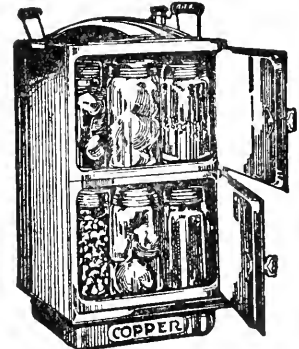
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Conservo Cooker

No. 20—Conservo, 21½ inches high, 11¾ inches square; 4 removable shelves; 2 pans; cooks for 3 to 15 persons; holds 14 one-quart jars for canning. No. 3—Conservo is 13½ inches high; 2 shelves; 1 pan; cooks for 2 or 3 persons; holds 6 one-quart jars for canning.

Works on any stove—wood, coal or gas



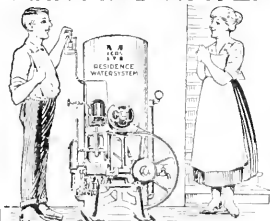
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"Conservo" is a time and money saver. It is a blessing to the housekeeper. Every home should have one. It will pay for itself in a few months' time by the saving in food and fuel. Foods cooked in it are delicious—they retain all their flavor and natural juices. Canning is done perfectly and with least possible effort.

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"Mother, we have been carrying water all our lives—think of the thousands of trips we have made to the well and the tons of water we have carried during all these years, and now we are through. The pump man who is installing the new MYERS ELECTRIC HOUSE PUMP for us told me that he would finish this afternoon, and then, goodbye water drudgery forever."

Such relief is coming to innumerable homes like yours through Myers Electric and Hydro-Pneumatic Pumps. If you are still carrying water and are sick and tired

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A SPECIALTY

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RICHLAND, WASH.

The Old Reliable

BELL & CO.

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Fruit and Produce

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is necessary to consider the relative cost of each.

The percentage of water soluble arsenic which a sample contains has been believed for many years to indicate the degree of injuriousness to the foliage of plants. Obviously only that arsenic which is brought into solution in the water used in spraying can be absorbed into the leaf substance and only that which is absorbed can injure the leaf. Therefore, in judging the quality of an arsenical insecticide it is always necessary to know the percentage of water soluble arsenic. Potato vines are not easily injured by arsenic and a much higher percentage of soluble arsenic is permissible in spraying them than in spraying delicate foliage like that of the peach. It follows then that a low water solubility such as is found in arsenate of lead is of no particular advantage in a poison for the potato

beetle, while it is an advantage in the spraying of fruit trees.

The next column in the table deals with the sticking quality, but we shall consider the column on texture at the same time. By texture it is intended to mean the degree of fineness of the powder. If examined under a low power microscope, a wide difference of fineness will be found in the various kinds of arsenicals. Paris green is coarse and the granules examined with a microscope appear like so many rocks on a plane surface. They are easily brushed off by showers of rain and the sticking quality naturally is poor. The same principle holds throughout and the more finely divided powder has a better sticking quality. A good sample of arsenate of lead is exceedingly fine. The precipitate is practically amorphous and when the water once dries out, leaving the poison on the foliage, it is not

easy to loosen it again. Foliage which has been sprayed in the spring may be found still white with the poison in the fall.

The settling quality is governed mainly by the texture of coarseness and by the specific gravity. It will be seen in the table that the settling quality very closely parallels the coarseness of the powder.

The cost per pound, as given in the table, is based on prices this spring and these prices are wholesale at the factory in 100 pound lots. It is noticeable that the prices of Paris green and arsenate of lead are high compared to the percentage of arsenic which they contain. This is especially true of arsenate of lead. With these facts before you it is possible to choose for yourself between these insecticides, but certain statements should be made regarding some of

Continued on page 16.

Blight-Proof Surprise Pear Stock ON Japan Root

Don't worry about blight taking your pear orchard. Plant the blight-proof Surprise and insure against loss. The following year topwork it to Bartlett, Bosc or any desired variety and you have a blight-proof trunk and framework. This method is endorsed by Prof. Reimer of the Southern Oregon Experiment Station, Talent, Oregon, and recommended by him after extensive experiments. Thousands of these trees have been planted the last few years in California and Southern Oregon, and to some extent in the Yakima Valley, Washington. Our buds were secured direct from Prof. Reimer.

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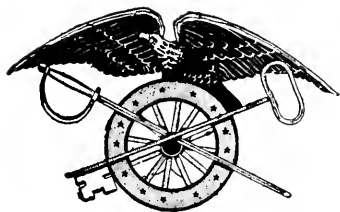
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War Department Sale of STOVES

The Quartermaster General of the Army has just released for sale a quantity of Stoves, Ranges and parts.

Included in this list are 4,884 All New Oil Drum Stoves originally designed for use on truck farms and in orchards to generate smudges as protection from frost and cold weather. This type of stove has been tested and found highly successful for this purpose, and this present lot should prove a boon to owners of fruit and truck farms all over the country. They are now available for immediate delivery.

LOOK THIS LIST OVER

LOT 12677 GS.

4,884 New, Oil, Drum. For smudge purposes on farms and in orchards.

Located at Jeffersonville, Ind.

**AND A QUANTITY OF OTHER WELL KNOWN
MAKES OF STOVES AND RANGES AND PARTS.**

Proposals for these Stoves and Ranges and requests for complete information and delivery can be obtained from the Depot Quartermaster at the address below.

1819 W. 39th Street,
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37 Stoves, Western Jewel No. 17,
new. 86 No. 20. 53 No. 15.

Located at Atlanta, Ga.

Details from Depot Quartermaster, Transportation Building, Atlanta, Ga.

LOT 16678 GS

174 Stoves, Oil, Perfection.

LOT 16683 GS

185 Stoves, Cannon Ball, No. 1.
32 No. 2.

Located at Camp Sheridan, Ala.
Details from Depot Quartermaster, Transportation Building, Atlanta, Ga.

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BETTER FRUIT

An Illustrated Magazine Devoted to the Interests of Modern Fruit Growing and Marketing.
Published Monthly

Better Fruit Publishing Company

703 Oregonian Building
PORTLAND, OREGON

Financing the Fruit Grower.

The additional financing of the Oregon prune crop made necessary by unfavorable weather and adverse marketing conditions by the bankers of Oregon is cause for widespread satisfaction upon the part of the fruitmen of that state, and, furthermore, is a signal tribute to the confidence that bankers have in the solidity of the methods of the Oregon Growers' Co-operative Association. It is also an acknowledgment from financial powers high up in the banking world that they are willing to stand behind the collective bargaining organizations of the fruitmen and farmers where they are organized on a sound basis. The loan advanced to the Oregon Growers' Co-operative Association for the purpose of carrying its members through an unforeseen and unpreventable critical period was no mere bagatelle, but the round sum of \$500,000.

As a result, the greater part of the immense prune industry of the state which is in the hands of the Oregon association is being carried safely along. Instead of having to wait for their money until the prunes are sold, growers are being advanced from two to five cents per pound when they are delivered at the warehouse of the association. This is being made possible by turning the warehouse receipts for the fruit over to the bankers as collateral.

Of course, an individual with a large tonnage and good security would probably be able to secure financial assistance for the same purpose, and then again he might not. The significance of the transaction, however, is in the fact that a big organization as a unit, with big resources and a trained marketing force, presents to the banker a security that the average fruit grower does not possess. It was this fact that the Portland clearing house of bankers took into consideration when they advanced this big loan and will take into consideration in future in financing the affairs of the Oregon Growers' Association or other large agricultural enterprises.

Advertising Will Do It.

The announcement of the Interstate Commerce Commission that the increase in freight rates on Northwest fruit must stand is a severe blow to the fruit growers of this section, for it means that this additional fixed charge must be taken care of by a lessened cost of production or a greater price for box apples.

Already Eastern growers, who are much nearer the big markets, are expressing their satisfaction over the decision. They admit the superiority of Western box fruit and believe the

higher price it must sell at will work much to their advantage.

However this may be, the fact still remains that the box package of apples—that is, such apples as are grown in the Northwest—is becoming more and more popular and is taking a firmer hold on the public. It remains, therefore, for the box apple grower to bring to the attention of the public on a much wider scale than ever before the merits of box fruit, and advertising will do it. With millions of consumers in this country and abroad who will not quibble over an additional quarter of half dollar for the finest quality of fruit in an attractive and easily handled package, advertising seems to present the most feasible plan of meeting the handicap of an extra marketing cost.

No Cause for Worry.

The fact that the apple crop of the country is not moving to market as rapidly as it did last year and in some other years we do not think is any cause for worry. The crop this year is not so large that it will swamp the markets of the world and a lessened demand now undoubtedly means a strong demand in the future.

In the Northwest, with its reduced crop and the building of many storage houses during the past year, growers are in better shape to await the later demand than ever before. According to government reports, growers and associations who do not believe they are being offered prices sufficiently high to justify them in selling their crops are placing their fruit in storage, and in fact statistics show a greater quantity of box apples in storage at this season of the year than ever before. The fruit, therefore, should be fed out to the market as it is needed at favorable prices.

With the inferior fruit produced abroad cleaned up, the export trade should show a decided picking up, while in this country the settlement of the election should have the effect of strengthening the demand for all commodities. We look, therefore, for a successful but not a bonanza year for the apple grower, notwithstanding some of the present handicaps.

An Adventure in Grafting.

J. M. Scroggs, two miles northeast of Colville, Washington, according to a report from Spokane, is a horticultural genius. He has forty-one varieties of fruit growing on one tree in his orchard. Starting with a Ben Davis apple tree about thirteen years ago, he began grafting different varieties of apples and pears on this tree. He says all the varieties are flourishing and that he has the earliest and the latest apples grown in Stevens County and all from this one tree. The apples are said to range in color from a brilliant yellow to a dark red and in taste from the sourest to the sweetest. The tree has been bearing fruit for seven years. The size of the fruit ranges from the size of a marble to 20 ounces in weight.

What the Papers Interested in Fruit Are Saying

The problem of the nurseryman is so complex that only men of courage and resource are willing to tackle it, no matter what the temptation of high prices. Indeed, this whole question of prices itself requires a lot of examination.

A rise of 1000 per cent in prices sounds fascinating, but if one begins too low the sum is not very great in the end. One thousand per cent on nothing, even when added to the original base number, is not very much. The simple fact is that prewar prices for nursery stock were too low. In many cases stock sold for less than the cost of production, even less than the prewar cost of production. Common price for apple trees was ten dollars a hundred. A fair price would have been eighteen to twenty dollars.

Now, with labor practically gone in cost and often unobtainable at any price, with the cost of all other items more than doubled, the nurseryman cannot figure a profit on his trees unless he can see ahead of him a price of thirty-five to fifty dollars a hundred for the trees which he propagates this year. 1920, will be ready for market in 1923. Will the fruit growers by that time be ready to take them at those prices? Or will the wildcat growers of nursery trees be ready with their job lots of cheap stock to bid down the market again? Really, it is a question.

Speaking of the rising cost of materials for the nurseryman, let us notice the one important item of stocks. Practically all growers of apple trees buy their stocks, and these now cost anywhere round sixty to one hundred dollars a thousand, instead of starting at seven dollars three years ago or three dollars and a half to four dollars ten years ago. That means a percentage of advance about equal to what the nurseryman is now passing on to the orchardist. The fact is that there is just as great a shortage of apple stocks relative to demand as there is of two-year-old apple trees. It is estimated that there is a total supply for the year of 7,000,000 apple seedlings, as against a normal turnover of 70,000,000. And nurserymen pay whatever is asked if only they can get the goods.

Thus it happens that some of them are actually paying ten cents apiece for seedling apple roots before propagation begins. That is as much as the full-grown two-year-old budded apple tree used to cost. Then if we figure a fifty per cent shrinkage between the seedling and the orchard stage, which is about a fair estimate, we discover that we have already invested twenty cents each in our trees for the planting of 1923, and we have not reckoned anything yet for the nurseryman and all his expenses.

In sober times before the military disturbances of our American nurserymen brought the seedling apple stocks on which they bud or graft all our standard varieties from two sources. The domestic supply came largely from Topeka, Kansas, where in the deep, fertile alluvium of the Kansas bottoms the cleanest, straightest and strongest roots were developed. The foreign supply came chiefly from France, and mainly from a similar river-flood plain along the valley of the Loire about Angers. The French stock, moreover, but were generally considered to be better.

Well, when the war came the French nurseries were wrecked and that source of supply was diminished nearly to the vanishing point. That made little difference in 1918 and 1919, when nobody wanted to propagate apple trees anyway, but it makes a great difference in 1920, when everybody wants to resume operations on an enlarged scale. The Kansas growers of stocks likewise were numerously out of the business during the European hostilities, and even now they are slow to get back to the old trade. There are difficulties still back of them.

Take notice that to grow apple seedlings requires apple seeds, and the same circumstances which put out of business the nurseryman and the stock grower simultaneously floored the collector and purveyor of apple seeds. The American source of supply has been established chiefly in a few localized collectors in New Hampshire, Vermont and Northern New York. When the fruit growers stopped planting orchards the nurserymen stopped propagating trees and the stock growers stopped growing stocks and the seed collectors stopped washing out the apple pomace from the cider mills and went to cutting cordwood for the fuel market. So the chain was broken in every link. *The Country Gentleman.*

Bastian Pruning Implements

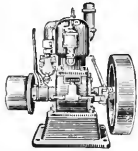


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THE FIRST NATIONAL BANK WEST
OF THE ROCKY MOUNTAINS

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Specialists in Apples and Pears

CABLE ADDRESS: BOTANIZING, LONDON

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Read These Letters

My old stump land now pays me \$125 per acre in cotton—and my crop is great, many ears 15 inches around. My One Man Kirstin pulled 28 inch red pine stumps. Also a 20 x 40 ft. store house to the astonishment of all present.—H. J. Thompson, Appleton, Ark.

Have tried the One Man Kirstin Stump Puller and it works fine. My little boy 10 years old can pull a good size tree with it. —C. G. Felt, Aberdeen, S.D.

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Weighs less—costs less. Has greater speed, strength and power. Lasts longer! With scientific Kirstin leverage principle a few pounds pull or push on handle exerts tons on stump!

My Big New Book on Stump Pullers FREE!
Tells how to pull stubborn stumps in a few minutes at low cost. Shows how the Kirstin clears acres from one anchor! Low speed to start, stump—high to rip it out quick! Patented quick "take up" for slack cable. Easily moved around field. Read the book—the 3 year GUARANTEE AGAINST BREAKAGE—Four Easy Ways to Pay and Several Agents' Photographs. Shipment from nearest distributor point saves time and freight. Write today! Address—
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A good line of trees for WINDBRAKE AND SHADE

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Several varieties of Currants.

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Fine Strawberry Plants—7 varieties.

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While we are now sold short on many varieties for this season, we have considerable stock yet to offer on which we will be glad to quote you. Will have a very complete list for next year's trade.

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Ask for prices, stating quantity you will want.

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Only Catalog Nurseries in Idaho.

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New Fall Catalog

Our new 64-page Fall Catalog of FLOWERING BULBS, ROSES, FRUIT, SHADE and ORNAMENTAL TREES and SHRUBS is now ready for you.

We offer you the "highest quality" stocks of real merit, varieties especially adapted to this Coast. Twenty years' practical experience here enables us to do it intelligently.

FALL SEEDS—Complete Seed Catalog on request. Write for prices on Fall Grain and Grasses, stating quantities wanted.

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OUR TREES

Carefully Grown
Carefully Selected
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Will give satisfaction to the planter

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Additional Salesmen Wanted

Strawberry Plants, Etc.

Finest, select stock—of the most profitable commercial varieties.

Fruit Trees

Sturdy, well rooted, choice.
Best varieties for every purpose.

Spray Materials and Supplies of All Kinds

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Everbearing Strawberries
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**FRUIT TREES
SMALL FRUITS AND
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Yakima, Washington

*"Yakima Grown" is
the best guarantee.*

Prune and Apple Trees

We offer choice Prune, Pear and Apple Trees, Black Walnut Seedlings, Marshall and New Oregon Strawberry Plants, Currants, Loganberry Tips and a full line of other nursery stock for fall delivery at very attractive prices while they last.

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TREBLA

The berry you have been waiting for. The canner that outyields all other varieties. Write for information and prices. Also plants of all other leading varieties.

LOGAN PLANTS.

Well rooted tips for early spring delivery.

Weeks & Pearmine

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BUY DIRECT FROM THE GROWER

Now is the time to send to Milton Nursery Company

Milton, Oregon

For their 1920-21 Catalog.

Full line of
NURSERY STOCK

"Genuineness and Quality"

Late Developments in Arsenical Insecticides

Continued from page 10.

them. Arsenite of zinc and arsenate of calcium are new and not well known. The dealers are not well informed about them, and if you were to obtain them you would probably have to deal directly with the manufacturers, though you should be able to get your dealer in town to put them into his stock. Arsenite of zinc has been on the market several years and we have experimented with it at the Experiment Station. It is noticeable that it contains a high percentage of arsenic compared to the cost, that it has a low water solubility, and a fine texture. If you wish to use it, I would

suggest that you begin on the potato and that you feel your way into its use in your orchards. I have used it at the Experiment Station on potatoes with excellent results for several years and do not hesitate to recommend it for the potato beetle. Arsenate of calcium is a newer product and we have found it very satisfactory as a remedy for the potato beetle. Its low cost particularly commends it, while it is very fine in texture.

I come now to white arsenic, which is produced in the Montana smelters in large amounts. When in 1917, in connection with the outbreak of grasshoppers in western Montana, we were in need of large amounts of poisons and could not get Paris green or arsenate of lead because of the unusual

conditions due to the war, we naturally thought of this supply of white arsenic in Anaconda and Great Falls. By a special arrangement I was able to get refined white arsenic, and we used it as a substitute for Paris green in the poison bran mash formula which is so universally used in the control of grasshoppers. The results, while not quite as good as with Paris green, were nevertheless satisfactory and we used large amounts of this poison in three or four counties in that year. We have found more recently, however, that the crude white arsenic just as it comes from the smelter is more satisfactory for our purpose because of its finer texture. The granules of the refined product are really quite coarse and because of this coarseness it is not possible to so thoroughly poison the particles of bran. We believe that the crude white arsenic in the poison bran mash formula, both for grasshoppers and for cutworms, has a bright future. Various other states are now using it and considerable has been written during the last year or two in the entomological journals.

I want to call your attention, also, to one more interesting thing about white arsenic. In certain work which we have been carrying on at the Experiment Station we have received some encouragement in the hope that white arsenic may be used in spraying potatoes. White arsenic is believed to be very soluble in water and one would think that it would be impossible to use it for spraying purposes. While we cannot fully explain the fact, we have found that we can spray potatoes with white arsenic, kill the potato beetles, and yet not injure the foliage at all. We have mixed it with water and sprayed the mixture at once upon the potato foliage and the failure to injure the leaves is perhaps explained in part by the short period of time that the arsenic was in the water, for when sprayed on the vines the water evaporated very quickly. We did not use any unusual haste in spraying. Our first experiment was with the refined white arsenic and later we used the crude product applied as a dust and our results were even better, due, we believe, to the fineness of the crude product. We expect to continue our experiments. Do not understand me as saying that I am recommending you to use either the refined or the crude white arsenic in spraying or dusting potatoes. On your own responsibility you may experiment as we have done, and I may say that under the climatic conditions which we have here in Montana there is some prospect that we may be able to save a considerable amount of money on arsenicals used in poisoning potatoes, and we probably are all aware that by far the greater part of the arsenical insecticides used in Montana is used on potato vines.

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After a big crop and long summer,
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A rest from growth and insects.
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Sites and Soils for Small Fruits

Continued from page 6.

practically very few soils but what the strawberry will succeed on. Those which are too dry or contain an excess of alkali or an accumulation of some injurious salt would not be desirable, but the average loam which has good air and soil drainage will produce some variety of strawberry, and one has the privilege of choosing from many hundred varieties. In the Inland Empire and in some of the mountainous valleys we find the Clark Seedling to be the leading berry, but in other sections the

Magoon, Sixteen-to-One, Senator Dunlap, Gold Dollar, Wilson and similar varieties are found to be most profitable. While it is true that strawberries can be grown in practically every region in the Northwest, certain regions, like Vancouver Island, parts of the Walla Walla, the Umpqua, Hood River, White Salmon and selected portions of the Willamette Valley, have become more noted, commercially, than other sections in the production of this berry.

The red raspberry thrives the best in the sandy and silt loams and in Western Oregon and Washington. Under the

climatic conditions that prevail they will respond to tremendous feedings of manure, especially where liquid manures can be applied the returns will be very gratifying. Our falls and winters are such that there is not the danger of winter-killing that one finds in the eastern part of the United States, when excess amounts of nitrogeous fertilizers are applied. The raspberry does not like cool soils or those which are poorly drained. Wherever it is possible to keep up a good moisture supply one should always choose the sandy or silt loams, not that the plants



The Complete Dormant Spray

—makes better quality fruit

IN almost every fruit section there are a few fruit-growers who produce better fruit and get a better price for it than their neighbors, and who also take the prizes at the fairs and fruit shows. Many of these skillful orchardists long ago selected Scalecide for their dormant spray—because Scalecide not only controls orchard pests controlled by other dormant sprays but does many things that no other spray or combination of sprays can do. Scalecide is becoming known even more for its invigorating effect on trees and its effectiveness in controlling other orchard troubles than for killing scale. Its invigorating effect is noted in increased

terminal growth; larger, darker foliage on bearing trees; and the holding of the foliage later in the Fall, thus accumulating starch and sugar which results in a plumper and stronger fruit spur. Scalecide kills insects, eggs and larvae of insects, and diseases that winter on the trunk or branches of the tree. It kills the hold-over cankers which cause fire blight, makes the old diseased bark peel off, and allows a new cambium to form. It kills the adults and controls Pear Psylla when applied in the Fall or on warm days in the Winter. (It is too late after their eggs are laid in the Spring). It kills aphids, too, when used as a delayed dormant spray.

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will not grow on other soils, but these are the types that will prove to be the most profitable.

The blackcap industry has been somewhat neglected on the Pacific Coast as a whole. Around Newberg there is quite an area of this berry being grown and in the Puyallup Valley they are being grown very successfully. It is a lover of deep, well-drained, moist loam and prefers a soil that is cool and abundantly supplied with humus. In the Inland Empire it thrives the best where the soil is somewhat shaded and kept cool by irrigation waters. The system that is used in the Payette Valley is subject to these conditions. We find the general requirements quite different to those necessary for the red raspberry, although the blackcap is by no means confined to this one type of soil. The river bottom soils of Western Oregon will all grow good blackcaps. It must be kept in mind that unless one can maintain a proper moisture supply, have good drainage and tillage that it is foolish to grow the blackcaps, as

they become small, hard and dry before anything can be done with them.

The blackberry offers an investment which should receive more attention. I have had cannermen tell me repeatedly in Oregon that they could use five hundred acres of blackberries if they could procure them. The blackberry seems to thrive much better west of the Cascades than it does east. We find in the lower mainland of British Columbia that the blackberry has proved very profitable, and in the Puyallup Valley the Evergreen is one of the most profitable berries grown. In the Willamette Valley and in the Rogue River Valley blackberries can be grown to a wonderful degree of perfection and ease, not only including such types as the Kittatinny and Snider, but the Brambles types and running types, such as the Mammoth and Evergreen, some of the valleys of the Inland Empire producing blackberries to very good advantage. It is fairly hardy and grows well in some of the higher valleys like North Powder. In Baker City I have

seen very luscious blackberries produced, and all over the Northwest more berries should be grown for home consumption. The blackberry is a great feeder and demands a fertile soil, one which will hold its moisture easily and one that is well drained. Ordinarily the clay loams are preferred for this berry. If the soil is somewhat lacking in plant food, stable manures or organic fertilizers should be applied as the plant will not grow successfully unless heavily fed.

The loganberry is found at the present time succeeding on soils ranging from the red hills down to the river bottoms. There is a difference of opinion as to which of these locations are the preferable. The writer has found splendid patches growing under all conditions. It is certain, however, that such river bottom soils as the Mission bottoms of the Willamette (this name is simply given to represent a type which extends along the Willamette and its tributaries) produce very heavy loganberry patches that are long lived. The loganberry should not be grown where the temperature drops down to the vicinity of zero or is apt to remain low for any time. Unless plants are protected from the cold they will not thrive. While there are portions of the Inland Empire along the Snake River that can grow the plants without protection, in the greater area of that region the soils and the atmospheric conditions are not of the best for this fruit. They do well in the coast regions and in the mountainous valleys of Western Washington and Oregon. Here the plant grows vigorously, is extremely productive and seems to find those conditions of soil and climate which produce maximum yields.

Great stories are often told of the production of gooseberries, and true it is that in Western Washington and Oregon this plant grows very luxuriantly. Very often within two years after setting the plants come into heavy bearing and give very satisfactory results. Some forms succeed better in the mountainous valleys of Western Oregon, owing to the prevalence of mildew nearer the Coast. The gooseberry likes cool, moist conditions. It will stand a northern exposure, more or less shade, a long growing season and cool weather. There are only certain types like the Red Jacket that seem to do well under the more or less arid conditions. What is true of the gooseberry is also true of the currant. Choose deep soils which have an abundant supply of plant food and moisture. A splendid income can be secured from both of these fruits. We could overdo the market if we all grew gooseberries and currants, nevertheless, more people should become interested in these fruits.

All in all, the Pacific Northwest is particularly fortunate in the ease with which small fruits can be grown. These industries should have had more careful study than they now receive. The possibility of by-products along these lines is almost unlimited.

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Northwest Fruit Notes From Here and There

OREGON.

The Stanfield Fruitgrowers' Union at Stanfield, Ore., which harvested a crop of 3,000 boxes of apples last year, expects to ship 20,000 boxes of fruit this season. The union at Stanfield has engaged as manager M. A. Mohr, a well-known fruitgrower of Hood River, Ore.

The Sunnelyffe orchard at Medford, Ore., recently changed hands, being purchased by Rupert Henry, a Chicago real estate man. The orchard was formerly owned by C. H. Chadwick. The property consists of 220 acres, 125 of which are in pears and apples, and the rest in grain and hay. It is located on the Talent irrigation ditch. The new owner will take charge of the property next spring.

It is announced that 300 orchardists are enrolled with the Oregon Growers' Co-opera-

tive Association in Jackson and Josephine Counties, comprising about one-half of the acreage in the fruit growing districts of those counties. The local members of the association include most of the largest orchards. Packing and warehouses have been located at Eagle Point, Grants Pass, Vothels, Phoenix, Gold Hill and Davis. The value of the association's property in the Rogue River Valley is stated to be \$85,000. The largest warehouse is located at Medford, where 200 people are being employed during the heavy apple and pear packing season. The acreage of the association in fruit now comprises 30,000 acres and extends from Portland to Ashland.

Professor A. Kikuchi, one of the best known authorities on fruits in Japan, recently spent a week at the Southern Oregon Experiment Station visiting with Professor F. C. Reimer, who is making extensive experiments with

blight-resistant varieties of pears. Professor Kikuchi is the director of the experiment station at Yokohama, Japan, where he is conducting very extensive experiments with Japanese pears. While Professor Reimer was in Japan, Director Kikuchi gave him very material assistance in traveling with him to various parts of Japan, where the wild pears of that country are most abundant. Professor Kikuchi is looked upon as the greatest authority in Japan on Japanese pears. He is vitally interested in the extensive experiments with pears conducted at the Southern Oregon Experiment Station and will spend the week studying the work at this station.

Reports from the Hood River district are to the effect that unless the price of cull apples looks up in price that they will not be very profitable to the grower this year. The opening price was \$8 per ton, which was offered by the local vinegar company. Libby, McNeil & Libby, who have a large cannery at The Dalles, and bought heavily last year, are re-

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ported to be holding off in buying apples for canning purposes. Prices last year for apples for canning ranged from \$16 to \$20 per ton.

Much alarm was felt by apple growers throughout Oregon during the month of October through the inability to get the crop harvested, due to bad weather. Continued rain caused pickers and packers to leave the orchards, and the wet weather made it difficult to get those who stayed to attempt to work. Where no provision was made for housing help the situation was particularly bad, and the schools were closed to allow students to assist in the work of gathering the crop.

It is generally accepted now that the Oregon prune crop in some sections of Oregon, Clarke County and Washington was injured by the wet weather to an extent ranging from 25 to 65 per cent. The exact extent of the damage, it is stated, will not be known until the final prune deliveries are made.

A general inspection of the orchards in the Roseburg district is being made under the auspices of the Extension Department of the Oregon Agricultural College. The work is being done by Professor Long, who recently took a position with the college as horticultural specialist, and is being taken up to determine the correct combative measures to be used for tree diseases that may exist in that section.

The Phez Company, one of the largest independent companies handling fruit products in the state, and the pioneer organization in placing on the big markets of the East the fruit juice drinks manufactured from loganberry and apple juice, announces that it has increased its capital stock to \$1,000,000. One million dollars of the preferred stock of the company has been placed on the market with a 7 per cent guarantee. The company has plants both in Oregon and Washington and ships its products to all parts of the world.

Oregon Malaga grapes grown at Grants Pass were marketed this year at good prices, the shipments bringing around \$3 a crate.

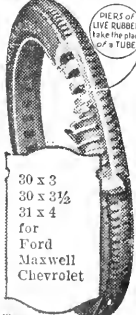
The Oregon Growers' Co-operative Association plans an expenditure of \$50,000 this year to advertise the fruit products it will handle. The largest part of this amount, it is stated, will be used in advertising the merits of the Oregon prune, which will be marketed under the new trade name of "Mistland."

A chemical factory, to be operated under the trade name of the San Francisco Chemical Company, is being established in Portland. The company, which, it is said, will be owned and controlled by the Stauffer International interests, has announced that its total investment in the new plant will be over \$1,000,000 when it is fully completed and in running order. It is to be erected in the Limton district.

WASHINGTON.

Spokane, Whitman, Lincoln, Ferry, Stevens and Pend Oreille counties will ship about 1,500 cars of apples and probably 50 cars of pears and other fruit this year. The leaf roller pest in the vicinity of Otis Orchards, east of Spokane, made inroads on the commercial output of some of the leading orchards. Stevens county's production will exceed last year's considerably.

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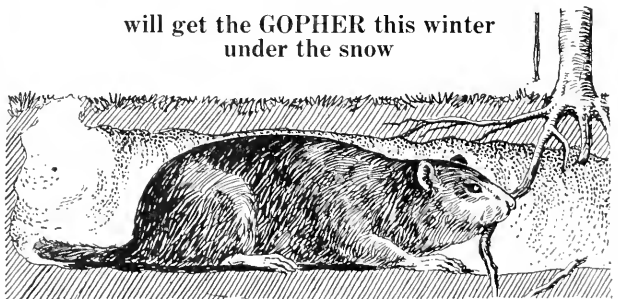
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The apple harvest has commenced in the Kettle River section, north of Spokane, good weather adding to the satisfaction of gathering the finest apple crop ever grown in this part of the upper Columbia Valley, as regards size, color and freedom from worms and scab. The yield is fully up to the average, some orchards producing much more than ever before. One grower expects to have 17,000 boxes. Some orchards that last year were seriously damaged with codling moth are virtually free from the pest this year.

At least 1,500 tons of Yakima cull apples will be converted into cider at the Lust & Walters plant, according to David Walters. The company has completely overhauled its plant and is preparing for a run of boiled cider. In former years it made fresh cider, but the Volstead act makes this impossible on a commercial basis. The company is paying \$6 a ton for cull apples, the lowest price since the cull apple market was developed. Last year the price went as high as \$20. The huge

plant of the Washington Evaporated Fruit Company is standing idle this year as there is no demand for dried apples at this time.

The first trade in Spokane Valley apples involving the 1920 crop embraced a lot of 50 cars and was handled by the Spokane Valley Growers' Union. Extra fancy Jonathans sold at \$2 to \$2.25 on the cars at Opportunity, which is about 25 cents under the opening price of last season. Delicious sold at \$2.50 to \$2.75 for extra fancy grades, which is 75 cents under the first prices of 1919, and extra fancy Winter Bananas are selling at \$2.25 to \$2.50 a box, which is about \$1 under the price a year ago.

The large addition to the plant of the Spokane Valley Growers' Union at Opportunity, adjoining the city, is almost completed and most of the mechanical appliances are in place. Much of this machinery has been designed especially for this plant, and work on its installation is being rushed in readiness

for the opening of the apple packing season. The plant has a capacity of 2,500 boxes per day of 10 hours, and requires 125 persons to keep it going at capacity.

A special car with 25 women apple packers arrived during October at Fairfield, 25 miles south of Spokane, direct from California, to pack the apple crop of the commercial orchard, containing 1,000 acres. It is estimated the crop of this orchard will be around 100,000 boxes.

Growers of the Lewiston-Clarkston section are going back into peaches. It is estimated that 250 acres of peach trees will be set out there in 1921. Many growers grabbed out peach orchards a few years ago and developed their attention wholly to apples. There is now a marked disposition to return to peaches, especially varieties best adapted to canning.

That the land along the sides and foothills of Moscow mountains in the Spokane country



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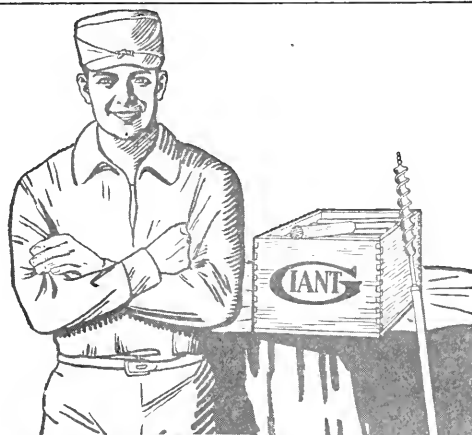
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STUMPING

EUREKA

is ideal for strawberries is the statement of L. A. Buswell of Viola, who has eight acres of ever-bearing strawberries, from which he has sold \$2,000 worth so far and the season will not end until cold weather. Mr. Buswell was selling 47 crates a week during the fall and supplies the towns of the Palouse country between Spokane and Lewiston. He is getting from \$4 to \$4.50 a crate.

Contrary to most apple shipping districts, figures recently compiled at Wenatchee show that a total of 500 more cars of apples were shipped from there up to October 15 this year than last year. This year, up to this date, 1,637 cars of apples had been shipped from Wenatchee while last year, on the same date, about 1,100 cars had been shipped. The highest shipment for that date this year was 125 cars. The record shipment for Wenatchee in 24 hours is 250 cars.

Due to the hail storms which visit Wenatchee at times and injure the fruit, many of the apple growers carry hail insurance. This year most of these hail insurance policies expired at midnight September 30. At 9 o'clock, or three hours before the policies expired, a hail storm visited the valley and did some damage. In commenting on this fact the Wenatchee Advance says: "While the damage was very slight, yet a number of growers have been paid substantial sums for the losses incurred. Never before was a hail storm heard of at this late date in the season, but it is a lucky thing for the policy holders that it did not occur 12 hours later."

IDAHO.

The apple harvest is about completed in Lewiston Orchards and the Indian Cache ranch, northeast of Lewiston, Idaho. During the height of the season the daily shipments reached 10 carloads. Most of the early pack was loaded in cars for immediate shipment, although warehouses are prepared for later storage. There are 10 packing houses operating in Lewiston Orchards and several in the Clarkston district. The large new warehouse of the Indian Cache ranch is now ready for use, and a packing house is operated in connection with it. Inspector C. G. Andrus, who is overseeing outgoing shipments, says the quality of the fruit this year far surpasses that of last season. In addition to local growers' associations, the Earl Fruit Company is operating in the field this year again, and three branches of the Skookum Packers' Association have been formed in the Lewiston-

Clarkston district. One large grower is packing under the Chinook brand. Winter Bananas, Jonathans and Delicious are the early varieties being shipped, with Newtowns to follow.

What They Are Doing in California

Large plantings of small fruits are reported from California. In the vicinity of Mountain View, hundreds of acres of strawberries and raspberries are being set.

The Roseville Drying and Packing Company, which recently started up a large dehydrating plant at Roseville, has been handling a large tonnage of grapes of various varieties. The demand on the plant has been so great that it is being worked continuously day and night.

Seventeen hundred tons of prunes and muscat grapes were dried during the month at a new dehydrating plant opened this fall at Santa Rosa. Another dehydrating plant, which has been opened at Santa Rosa, has a capacity of 10 tons per day and expects to operate the year around.

The Yucaipa country, which is being rapidly developed as an apple-growing section in California, is giving promise of being one of the most important apple-growing sections on the Pacific Coast. The crop there this year is said to be especially fine and growers are expecting good prices. The latest methods have been adopted, and the district has an active association that is handling a large share of the crop.

Reports are to the effect that some of the grape growers in Yolo County will average \$600 worth of seedless raisins to the acre this fall.

California shipped 46,757 carloads of citrus fruits, valued at \$81,200,000, in the season just ended, according to the report of G. Harold Powell, general manager of the California Fruit Growers' Exchange. The report was given to the directors of that organization at their annual meeting recently.

Director Hecke of the State Department of Agriculture of California announces the appointment of G. Spencer Wice as inspector with headquarters at Los Angeles, where he



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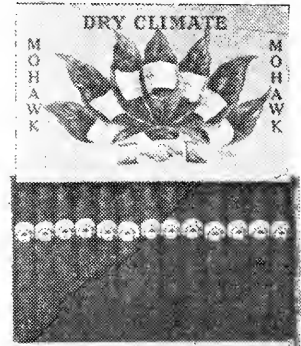
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HOOD RIVER, OREGON

State Distributors of the "FRIEND" Sprayers

will be attached to the force of Field Entomologist D. B. Macomber. Mr. Wice is a graduate of the Iowa State College, and prior to this was with the Agricultural Extension Service of the C., B. & Q. Railway. He was also engaged in agricultural reclamation work in Maryland in the United States Civil Service. At present his duties will be confined to work on the walnut codling moth in Southern counties.

Prune and apricot growers, non-members of the California Prune and Apricot Growers, Inc., the growers' state-wide co-operative marketing association who stood to lose hundreds of thousands of dollars on their 1920 crops through their inability to find immediate buyers for their fruit, will be permitted to sell their 1920 crops through the association under terms of an arrangement that has recently been made. The association will take care of the prunes and apricots these growers deliver by forming a second pool and making a first payment to them equal to the collateral value of their fruits in the warehouses of the association. Growers taking advantage of the association's offer will sign the regular crop contract and become members of the association. H. G. Coykendall, general manager of the association, said that the association would fully protect its present members by not selling a pound of the prunes or apricots received under the new arrangement until it had made complete settlement with its old members for all the fruit they delivered this fall. Hundreds of outside growers were left stranded last August when the association refused to handle crops for non-members after it had named the price it would pay its members for their fruit. The independent packers, it is said, finding these outside growers at their mercy, have been declining to buy their fruit except at prices several cents under the existing market quotations.

California As A Boxed Apple State

Few people, says the Monthly Bulletin of the California State Department of Agriculture, realize the importance of California as a boxed apple state. Of the total number of cars of boxed apples shipped in 1919, California ranked second, the State of Washington being the only one to exceed it. According to figures recently given by the United States Bureau of Markets, California was followed by the number of cars shipped in 1919 by Oregon, Idaho and Colorado in that order named. These figures show that California in 1919 shipped 417 cars, and of that number 539 cars were unloaded in New York City, and that 76 per cent of California apples were unloaded at the ten principal market centers of the United States. It would seem, therefore, that New York is by far the most important outlet for Western apples.

That California will continue to be a very important factor in the shipment of boxed apples is indicated by the statistics covering the non-bearing acreage of the state. Figures compiled by the California Development Board show that there were 690,835 non-bearing trees in San Bernardino County alone in 1919, which is more than the total number of bearing and non-bearing trees in Santa Cruz County for the same year. These figures it is stated, may be taken as indicative of the non-bearing acreage in other Southern California districts.

Bits About Fruit, Fruitmen and Fruit Growers

According to a cablegram of recent date from the American Agricultural Trade Commissioner in London, cheap varieties of apples from European countries are now glutting the English market, and the supply will last until early November. The supply of American apples was also reported as plentiful. The total quantity reported landed and afloat for the English market on October 11 was reported at 125,000 barrels.

A statement recently issued by C. B. Stewart, Jr., business manager of the Florida Citrus Exchange, is to the effect that the coming season's crop of citrus fruits in Florida will be somewhat less than last year's yield. Mr. Stewart says reports reaching the Tampa offices of the Exchange from the various citrus sections of the state indicate the orange crop now showing on the trees to be somewhat in excess of that of last year. But the apparent shortage of grapefruit will more than offset this, if reports are accurate. He says it is extremely difficult to make a close estimate while fruit still is green on the trees; and that even the closest of present estimates must be subject to revision later.

A report furnished to the Bureau of Markets in regard to the wiring of fruit packages for export is of particular interest to the Northwest shippers. The report is as follows: "That effective for all shipments leav-

ing point of origin on and after July 15, 1920, apples and other green or citrus fruits in boxes must be strapped or wired; also, that all dried fruits, canned goods, including canned meats and goods packed in jars or bottles, shall be charged 10 cents per 100 pounds in addition to the individual rates of the line over which the commodity is shipped, unless containers are strapped or wired."

The American Fruit Growers, Inc., has recently made public the figures for its first thirteen months of operation, ending June 30, 1920. Its gross sales were \$34,487,000, and surplus earnings, after payment of all interest charges, Federal taxes for 1919, and preferred stock dividends, were \$691,227, equal to approximately \$13 per share on the outstanding common stock.

During that period the company handled 31,280 cars of fruits and vegetables, made up as follows: Potatoes, 6,120 cars; citrus fruits,

5,262 cars; cantaloupes, 4,718 cars; apples, 2,803 cars; other, 12,187 cars.

The company maintains extensive jobbing offices in New York, Pittsburgh, Chicago and St. Louis, and car-lot sales offices in the other principal markets of the country. In addition to its marketing operations, the company owns and operates more than 8,000 acres of apple and peach orchards, citrus groves and vegetable farms located in the best commercial districts and representing an investment of \$5,600,000. The company has outstanding \$5,202,800, 7 per cent, cumulative convertible preferred stock, 53,581 shares of common stock at \$10 per value, and \$1,000,000, 7 per cent, convertible notes due 1922-26.

The company's fifth regular quarterly dividend on its preferred stock was payable October 20. The American Fruit Growers operates in every section of the United States and is concerned with all branches of the fruit and vegetable industry from growing the crops



The tree at the right was planted in a spade-dug hole in the same orchard and at the same time as the one above.

The tree at the left was planted in dynamited hole. Cultivation methods did not differ from those given to trees planted without using dynamite.



Plant with Dynamite— Trees bear a year sooner

EXPLODING a very small charge of dynamite in the ground when a tree is to be planted not only makes the planting easier but the sub-soil is so shattered that roots grow faster and greater stores of plant-food are made available.

America's leading orchardists and nurserymen who have planted millions of trees with



say that their trees bear fruit a year (frequently two years) earlier than those planted in spade-dug holes; first year losses are practically stopped; fungus and nematode are completely destroyed; fruit is finer in quality and size.

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Write for details on tree planting described in our book "Developing Logged-off Lands." It is yours for the asking.

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The good tobacco taste lasts so long—a small chew of this class of tobacco lasts much longer than a big chew of the old kind. That's why it costs less to use.

Any man who has used both kinds will tell you that.

Put up in two styles

W-B CUT is a long fine-cut tobacco

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Not so the modern oil heater. Filled with PEARL OIL it gives instant heat *anywhere*, at any time. It sees a continuous round of service—bedroom—dining room—kitchen—parlor—and bedroom again in the evening. PEARL OIL burns without smoke or odor. Economical. Sold in bulk by dealers everywhere

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STANDARD OIL COMPANY
(California)

to their transportation and final distribution. Their facilities are available for growers in any part of the country, who are thus enabled to market their crops where the demand is greatest.

Cannery Notes

Three thousand barrels of Maraschino cherries were put up this year from Oregon fruit by the Libby, McNeil & Libby plant in The Dalles, Ore.

Another big fruit and vegetable cannery, the seventh owned by the A. Rupert Company, has just been completed at McMinnville, Ore., at a cost of \$50,000. This gives the concern a capacity of 750,000 cases during the season, an output that means an expenditure of about \$2,250,000 for farm and orchard produce. During the past eight months \$150,000 has been the various Rupert plants.

That American canned foods are popular in Great Britain is shown by a letter from Edgar A. Foley, Commissioner of the United States Department of Agriculture in London, to E. G. Montgomery, in charge of the Foreign Markets Service. It says in part:

"American canned fruits have earned an enviable reputation for themselves in Great Britain. In all the grocery and fruit shops one can see the well-known United States brands that have long since become staples in the American household.

"So wide has been this distribution that in five stores within a radius of two blocks from Cross & Blackwell's factory I counted four stores carrying United States canned foods and pickles. I maintain that it is some accomplishment to put American pickles and canned goods on sale opposite the Cross & Blackwell works. American peaches, pears, apricots and plums have all had a good sale and wide distribution, and to within the last few months have brought top prices.

"Large stores of canned foods were held here in Great Britain at the end of last season, but as the demand was good, local merchants purchased heavy stores for this season at good prices. They forgot to figure on these canteen stores held mostly in France, with the result that when speculators and others bought these canteen stocks and brought them to England there was a large over-supply. It is estimated that the present supply is about 3,000,000 cases above the normal supply.

"The result has, of course, been an enormous drop in all prices, and the bankruptcy of many firms for large amounts. There is now no recognized price for any goods, and any quantities of peaches, pears or apricots can be purchased for 50 per cent of the importing price.

"An exception to this rule is, however, the Hawaiian pineapple crop. In spite of adverse conditions this market remains firm, and the product is in demand.

"It comes directly in competition with a great deal of colonial pine, but the high quality of the pack gives it a place of its own. We can well be proud of this pack. The cubes are even and the slices are likewise even and well cut. The colonials are far behind in pack. Their idea is to cut the pine in any shape to get it into the can. The result is a very poor pack and a resultant poor price.

"There is practically no American jam on the market at the present time."

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of the purest, whitest and best light known to science. Nothing to wear out or get out of order. Simple. Safe. Absolute satisfaction guaranteed. Send for catalog showing lamps for every purpose; also special introductory offer and agency proposition. Write today.

KNIGHT LIGHT & SODA FOUNTAIN COMPANY, Dept. 409 Chicago

Whip Grafting

Roots and scions for whip grafting should be secured in the fall of the year and stored. The work of grafting, says the United States Bureau of Plant Pathology, may then be done during the winter months. When the operation has been performed, the grafts are packed away in moss, sawdust or sand in a cool cellar to remain until spring. It is important that the place of storage should be cool, else the grafts may start into growth and be ruined, or heating and rotting may occur. If the temperature is kept low—not above 40 degrees F.—there will be no growth except callusing and the knitting together of stock and scion.

In ordinary propagation by means of whip grafts, the scion is cut with about three buds, and the stock is nearly as long as the scion. The graft is so planted as to bring the union of stock and scion not very far below the surface of the ground; but where the trees are required to be especially hardy in order to stand severe winters, and the roots used are not known to be so hardy as the plants from which the scions have been cut, a different plan is adopted. The scions are cut much longer and the roots may be cut shorter, and the graft is planted so deep as to cause roots to issue from the lower end of the scion. When taken up to be set in the orchard, the original root may be removed entirely, leaving nothing but the scion and the roots which have been put forth from it.

Decorating the Ranch Home

By N. M. Collart.

A long looked for transition is today taking place in the character of the farm home. In a general way this may be illustrated by the picture of the buildings on the prosperous farm as they used to be and as they are coming to be.

You have noticed many times doubtless the splendid barns and sheds to house efficient cultivating and reaping machinery when passing some farm and have turned in wonder, as I have, to look at the modest and frequently insignificant home for the farmer's family. There was a time when it was proverbial for a farmer to work from "can't see" in the morning until "can't see" at night. Under such conditions the farmer had little ambition or desire to improve his home.

With the shortening of the farmer's working hours, due to improved machinery, quicker transportation and better prices, folks from the country not only have more time for home life, but can intermingle more freely with neighbors, both in the country and city, bringing about an interchange of ideas with resultant desire for the better things of the house.

This desire finds expression not only in the desire for better furniture, articles of comfort or luxury and a

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You can send your apples direct from the United States into the industrial centers of England. The same organization (J. & H. Goodwin, Ltd., throughout) which ships your fruit from the U. S. A., sells and distributes in London, Liverpool, Manchester and Hull, and on the European Continent.

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For dependable export information write or wire us at 60 State St., Boston, Mass. or 97 Warren St., New York City.

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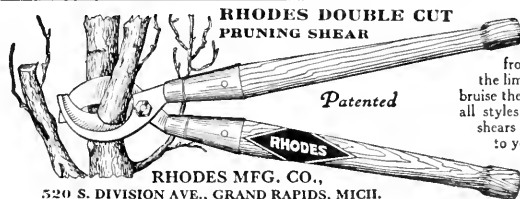
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WE CARRY—AND CAN SHIP IN 24
HOURS—STOCK LABELS FOR PEARS,
APPLES, CHERRIES & STRAWBERRIES.

big touring car, but a general brightening up and improvement in the home itself.

Mother and the girls receive their regular magazines and are taking inventory of their general surroundings with the result that the Department of Decoration of the Sherwin-Williams Co. finds it quite as common to receive inquiries for country homes as for the city. There is no reason in the world why the country home should not have just the same features to make it a source of pride and comfort.

Woman is, generally speaking, more sensitive to color than the man of the same class. This is evidenced by the many little uses of color employed by every housewife. Color represents moods to a woman and the most stolid nature responds to the cheer of soft appropriate wall colors which set off the beauty of her curtains, furniture and rugs.

Color is best appreciated in bright bold touches used in small areas such as the flower in the stencil pattern near the ceiling. The curtains should be in clean tones, soft shades when solid color, bright when figured. The tones of the rug should never be "noisy." The wall color, which occupies by far the biggest portion seen by the eye, should be in neutral shades such as warm grays, soft tans and gray-greens or gray-blues.

The decorative scheme employed supplies the atmosphere in which you live your home life, and whether this life be contented with a harmonious arrangement of colors or full of jangling discords in surroundings in cheap and garrish effects is fortunately well within your power to secure.

Protect the Orchard Machinery

Many a piece of farm machinery is broken in use, at a busy, critical period, because the part has become weakened by rust.

Nowadays, when a machine breaks, it is not only the cost of replacement to be considered, but the machine may be out of service for several days or weeks because the dealer's stock of parts is low and completely out on some items.

And it isn't the dealer's fault, either, in most cases. He has orders in for short stock parts, but ordering is one thing and getting orders filled is something else, as all machinery dealers and their customers know to their sorrow.

All farm machinery should be kept painted. Reduce breakage to the minimum. Parts will break often enough when machines are handled with the utmost care, but just now, when replacements are so expensive and so difficult to get promptly, regardless of price, the least the farmer can do is guard against this unnecessary weakening of essential equipment by allowing rust to set in on it.

Fortunately paint isn't scarce. It takes very little time to apply it and

the cost is nothing compared to the loss of several days' use of an important machine at a critical period in planting, cultivating or harvesting time.

ATTENTION!

Boys and Girls

I want to hear from every boy and girl who would be willing to devote just about one hour's spare time. I will reward them for their services with choice of the following articles:

Premo Cameras

Raincoats

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Beautiful pencil boxes with assortment of pencils and pens

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Fruit trees budded from bearing orchards. Apple, Pear, Cherry, Peach, Plum, Truene, Apricot, Quince, Grape Vines, Strawberry, Plants, Raspberries, Blackberries, Logan, Dewberries, Asparagus, Rhubarb, Flowering Shrubs, Roses, Vines, Hedge, Nut and Shade Trees. Carriage paid. Satisfaction guaranteed.

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VENTILATED Sublimed Sulphur—Impalpable Powder, 100% pure, in double sacks, for Dry Dusting and making Paste Sulphur.

For LIME-SULPHUR SOLUTION, use our DIAMOND "S" BRAND REFINED FLOUR SULPHUR. We can furnish you this sulphur at such a low price that it would pay you to mix your own solution and net you a profit equal to the amount paid out for labor in spraying your orchard, even if you pay your men \$5 per day for making the solution and applying same.

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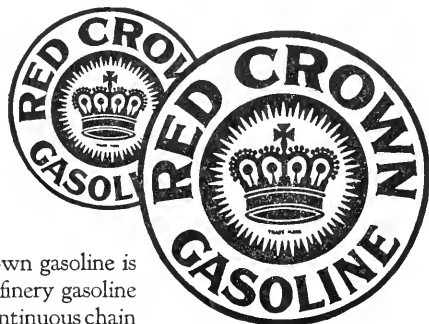
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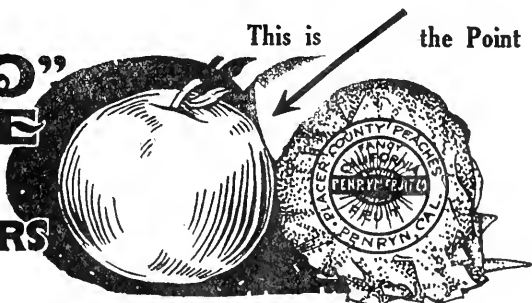


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"Caro" Protects
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"Caro"
Prolongs the
Life of Fruit
Why?

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There are no buildings on this place. The Pacific University, schools, churches, stores and amusements are at Forest Grove.

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The owner is a civil war veteran and is about to retire. This is the reason for offering this place for sale.

Price \$700 per acre.

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PRICE \$13,500.

We have many fine propositions in this ideal locality on Puget Sound, where roads are good, climate the best, and prices very reasonable. Address

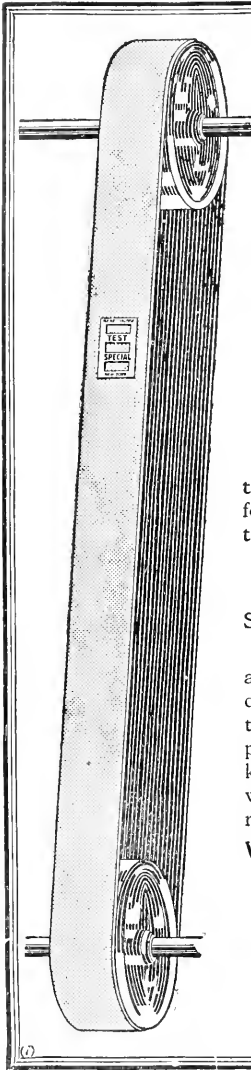
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Canada is the United States' second best customer; Canadians buy annually in the United States \$800,000,000 worth of merchandise.

American Exporters to Canada are finding that the existence of their Canadian trade is threatened by four things:

- the refusal of many Canadian importers to accept an American discount on the Canadian dollar:
- the rapid growth of the "Made in Canada" movement:
- the spread of sentiment favoring British Preferential Tariffs and Imperial trade: and
- a growing tendency on the part of Canadians to buy where their dollar is at a premium rather than in the United States.

Forty per cent of the United States' exports go to British possessions. The forward-looking American manufacturing exporter who desires to develop his Canadian and British Empire trade will investigate the opportunities Canada offers him.

The Statistical Department of the Union Bank of Canada will gladly assist American manufacturers in the investigation of Canadian conditions and the location of suitable plant sites.

Write Department "A" for Booklet.

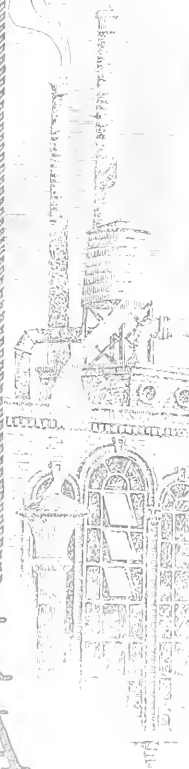
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BETTER FRUIT

VOLUME XV

Lochs 7-12 Ave. DECEMBER, 1920

NUMBER 6

DEC 1920

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PEAR HARVESTING SCENE IN THE ROGUE RIVER VALLEY, OREGON

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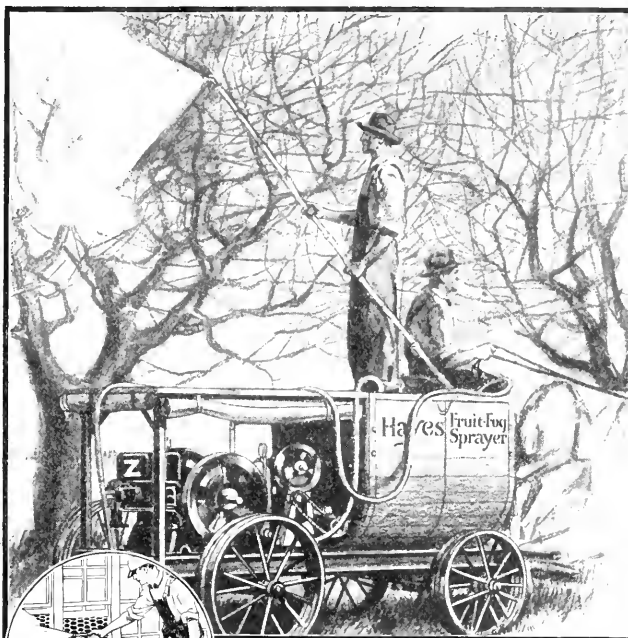
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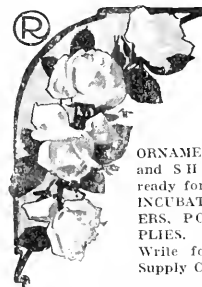
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The Pruning and Care of Young Apple Trees

Written for Better Fruit by An Experienced Orchardist

SO MUCH has been written upon the subject of the pruning of a young orchard that one wonders what possibly remains to be said upon that subject, but, as surely as the different methods of pruning are based somewhat upon theory, so surely will it remain undecided as to which of the different methods and theories are correct. Then, again, it is surprising to find how many orchardists, or rather people who own young orchards, there are who are so ignorant regarding the simplest principles of pruning, an example of which the writer recalls in looking over a young orchard, to see half inch to inch stubs left and carefully covered with walnut wax and, when asked why he left such long stubs, the owner said that was the way he was told to do it by one whom he thought knew. So, possibly, some of the points brought out in this little article may prove of value to the owner of a young orchard.

It is hardly necessary to state that the tree should be planted just as soon as possible in the spring and the bud placed from 2 to 4 inches under the surface of the ground, the whole tree slanted slightly to the prevailing wind. It is advisable not to cut the tree back immediately after planting as in certain sections the bud weevil is apt to make its appearance at this time. The weevil always climbs to the top of the tree and eats up the buds. The writer has sometimes headed newly set trees where there were often 6 to 8 weavils eating the buds from the top of a single tree. Incidentally, the weevil is very hard to control, the only satisfactory method of a great many tried is to fasten a cone of tin with the apex upward on the trunk of each tree.

Before the leaves start to open cut the tree back to a good bud 28 to 32 inches above the ground. Cut at an angle of 45 degrees and preferably to a bud on the windy side of the tree. Cut one-fourth inch above the bud as the trunk of the tree does not swell very much the first year and the wood dies back probably one-eighth inch; then the second year cut the trunk again close to the top limb and the wound will quickly heal over. If the tree is branched, cut off the lower limbs, but save some of the upper limbs if

one should be in a desirable place, as, if the limb should be removed, a bud might not force itself out at that place, but prune these limbs back rather hard. Sometimes in May after the trees have leafed out, rub off all shoots within 16 to 18 inches of the ground and, if all the buds come out above, possibly a few of these may be rubbed off. This is all the pruning for the first year.

Beginning the second year prune any time before the leaves start and cut off the top stub, if there be any, flush with the top limb. Leave 4 to 6 limbs because the more limbs left the fewer crotches there will be after the third pruning and, later, should the snow or a heavy load of fruit break off a limb, the tree will not be crippled as if otherwise would be were there only three limbs. Have the bottom limb 16 to 18 inches from the ground, thus spreading the head approximately a foot or more and let the limbs be divided equally in that distance. It is sometimes advisable to take out the top limb to open up the center with varieties that shoot up too straight, such as the Arkansas Black. Always take out the second

limbs, i. e., the ones just below the top, as before long this limb forms a perfect crotch with the top limb and is always the first to break in a deep snow. The writer has seen after a bad winter a whole row of trees where the second limb and only the second limb has split in every tree in the row. Prune to an outside bud and cut off one-sixteenth to one-eighth inch above the bud, quite near, but not too near as the bud may dry out and not start to grow. In pruning lumps off from the trunk cut close but not exactly up to the trunk, but to a little collar at the base of the limb, because when the cut is close to the tree and the tree swells it leaves a little hole in the trunk for water and disease to enter and if the cut is out from the tree the following year the trunk swells to the cut and grows over it. However, this is more important with the larger limbs than with the smaller, but never leave a stub. Cut the limbs back to about 10 inches of their growth, maybe 12 inches, if the tree makes a good growth, otherwise shorter. If the limbs are pruned quite short and there are not many limbs, the following year the forks will be too close to the trunk. Carry a can of thick white lead around and paint the top of the trunk and the larger wounds. White lead or red lead is more satisfactory than any of the waxes as the hard waxes all crack and split off when the tree swells. The latter part of May rub off some of the inside and superfluous limbs and the pruning for that year is done.

This brings us to the spring of the third year and the tree is a two-year-old. It is now necessary to choose between the two fundamental types of trees, the central leader or the open centered. There are certain advantages in both types, but on the whole the writer is inclined to a modified form of the central leader where the tree is started with a leader in the center and is opened up to suit the variety and the conditions of the locality. It is quite difficult to fill in a tree that is too open after it is allowed to bear fruit, but very easy to open up a tree that does not allow sufficient sunlight to color the fruit. An open centered tree is not as strong as the leader tree, is more susceptible to splitting and needs



Two year old tree pruned.



Illustrations showing three and four year old trees after being pruned. In the center of the four year old tree can be seen the natural tree brace which has just been started.

more bracing. Then there are so many varieties that open up as they get older and bear fruit, such as the Jonathan, Winter Banana, Spitzenburg and Ortley, that it is very advisable in dealing with these varieties to have plenty of limbs and not to have the tree too open. The third year prune off one-half to two-thirds of the new growth allowing one or two more limbs to be added to the system, but being careful of crotches, formed by two limbs coming from buds too near together on the older limb, also continuing the leader in the center. Prune usually to outside buds, except where there is considerable wind and in the case of a variety like the Jonathan when it is advisable to prune all limbs to the wind. Take the can of white lead around again and paint all large wounds. Be careful not to prune all the limbs the same height from the ground, thus making the top of the tree look as though it had been sheared and giving the whole tree a storied appearance. Should the tree be headed too high, or there being no limb in the trunk where the grower might desire one, often the insertion of a bud in August will start a limb the following spring. This bud will not always grow, but will frequently remain dormant for a season and sometimes start the following spring. By the end of this season we should have a fairly well shaped tree. The writer does not believe in summer pruning (heading back in the summer) a very young tree. The theory is that it is unnecessary to secure a long thin growth, and checking the flow of sap at the terminals makes the limbs and trunk larger on that account. This is very often true but we find that entirely checking the growth of the tree devitalizes it so much that in the long run it will not measure up in size with a tree that has been let alone in the summer time. Then again, this checking starts a tender growth at the terminals which usually grows later

in the fall and the wood does not ripen up as well as it should to enter the winter and the limbs are therefore more susceptible to winter killing. Summer pruning for fruit a year or two later is entirely a different matter, but the first few years we want only to get as strong and large a tree as possible.

Our tree is now three years old. This year two new steps enter into the shaping of the tree, the addition of laterals and natural braces. We have not mentioned natural braces (the weaving together of two cross limbs) heretofore, as it is desirable to have them rather high up above the head of the tree, thus allowing less leverage upon the limb in question when the strain of a heavy load of fruit is upon it. The writer believes in being very generous in the use of the natural brace,—it may be somewhat of a nuisance to remove the water sprouts each year from the braces when the tree is young, but that is far preferable to having a limb split and ruining the shape of the tree. Again prune off one-half the new growth, opening up the leader in the center and allowing possibly one lateral to each main limb to come out radially from the center of the tree. Choose the laterals several buds below where the second year's growth is pruned off so as to eliminate the tendency to crotch and prune the laterals more severely than the upright limbs. From now on the grower will probably have ideas of his own as to the shaping of his trees and will need no more advice so we will here leave him for better or for worse.

Protecting Young Trees.

Not included in the category of pruning is the care of young trees where they are apt to be hurt by storms. Should they not be cared for the problem of pruning becomes a complicated one. In sections where deep snows and

silver thaws are likely to occur young trees should be staked and tied. Should the tying prove useful only once in four or five years, the saving of the trees that one year will justify the expense. The writer has tied up trees for several years, but only once during that time was there a very bad storm, then every tied-up tree was completely untouched while there was considerable breaking of limbs and trunks in orchards that were not protected. There need be no fear whatsoever that the limbs, no matter how tightly they may be gathered together, will not spring back to their original place when the cords are cut in the spring. Binding twine is best for this tying. For the one-year-old trees it is safer to stake each tree, driving the stake about a foot from the base of the trunk and slanting it slightly inwards,—then the branches are gathered tightly in two places and they are first tied to the trunk and the whole is then tied to the stake. This absolutely protects a young tree from any injury due to storms in winter.

When the tree has had two seasons growth, the trunk is usually strong enough to do away with the staking, but the branches are gathered in above the head as tightly as they can be drawn without breaking and then tied. They are tied again at the top and this gives great stiffness to the tree and eliminates any center where there can collect a ball of snow or ice. It is better for this work to be done by two persons, one to gather in and hold the limbs and the other to do the tying. After the third season the trees should be able to take care of themselves, though it is a simple protection to run one cord around the branches at about the middle of the tree and to draw in rather tightly. It might be thought that this is going to considerable trouble and expense to insure the safety of the trees, but the total cost for several years will not equal the damage a young orchard might receive during a single storm.



Young tree tied up to protect it from snow and sleet.

Smoke and Direct Radiation in Frost Protection

By Floyd D. Young, Meteorologist U.S. Weather Bureau

SMUDGING, or the creation of dense blankets of smoke over fields and orchards on frosty nights through the burning of damp straw or other material, has been practiced since the beginning of the Christian era. In his "Natural History", published A. D. 77, Pliny the Elder advised farmers of his day when frost threatened to "make bonfires in the fields and vineyards of cuttings or heaps of chaff, or else of weeds that have been rooted up; the smoke will act as a good preservative". The degree of faith in the efficacy of this method of protection that prevailed in Germany near the end of the 17th century is shown by the fact that smudging was compulsory in one part of that country.

Only comparatively recently have some orchardists come to believe that actual warming of the surface air is of greater importance than creating a smoke cover, and the belief is still held by many that the smoke and other products of combustion from the fires check the loss of heat from the ground and prevent a further fall in temperature.

In order to determine accurately just how effective the smoke cover is in diminishing the rate at which heat is lost to the sky, instruments for measuring the rate of nocturnal radiation were installed in the Pomona Valley, Cal., in the fall of 1918. Observations were made every half hour from sunset to sunrise during two clear nights when there was no firing, in order to find out whether there was much variation in the rate at which heat was radiated to the sky. These radiations, reduced to a common temperature basis, showed the rate of radiation to be relatively uniform throughout both these nights.

The 1918-19 frost season proved to be the most severe in years. Firing was general over the entire valley and was continued for from nine to ten hours on four different nights. Radiation observations were begun before the heaters were lighted, to obtain the rate at which heat was being lost to the clear sky, and were continued all night under a smoke cover that increased in density as the night progressed. Since the rate of radiation was fairly uniform during clear nights when there was no smoke cover, any decrease in the rate after the heaters were lighted could be attributed to the influence of the smoke.

As the smoke often remains near the ground, the first observations were made from the top of a fourteen-foot tower, at about the height of the tops of the trees in an orange grove, in order to find out whether the lower portion of the trees does not receive more benefit from diminished radiation than the top. (See figure 1.)

During the two nights on which observations were made from this tower, very little smoke rose above the top of the instrument shelter and the rate of radiation showed no appreciable decrease as a result of the firing.

The radiation instruments were then moved to a location on the ground in a small open space in the same grove, and observations were made on two nights during which the smoke was probably as heavy as will ever be experienced anywhere. Despite this heavy smoke, the rate of radiation was diminished by

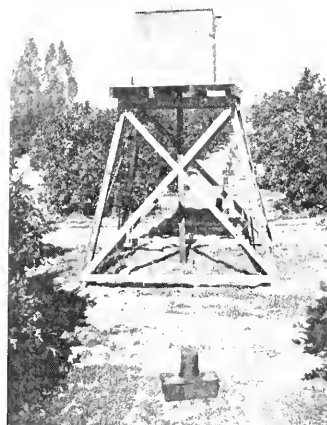
tion due to the smoke was 9 per cent, with an individual reading which showed a decrease of 26 per cent.

The rate at which heat is radiated from the ground decreases very rapidly as the temperature falls. As the orchard heaters are not lighted until the temperature has reached a comparatively low point, a reduction of even 25 per cent in the radiation at this time is not very important; in order to prevent damage through the use of the smoke cover alone, the rate of radiation would have to be cut down at least 80 per cent. It is evident that the smoke would be of far greater value in protection against frost damage if it were completely consumed in the heaters.

The smoke may often be of indirect benefit in preventing a too rapid thawing of frozen fruit or blossoms at sunrise, but from the data at hand it appears that neither in this connection nor in its influence in reducing the rate of radiation of heat to the sky, is damage from a moderately severe frost to be prevented by a smoke cover alone. When the lowest temperature during the night is only slightly below the danger point, a heavy smoke from smudge fires may lessen or prevent damage, but to combat a frost which would otherwise cause widespread damage, it is necessary to supply great quantities of heat to the surface air to replace that which has been lost by radiation to the sky. In most cases the straw or manure burned to create a smoke over the orchard would do more good if used for fertilizer, making the trees more vigorous and therefore better able to resist damage by low temperature.

Radiation From Heaters to Trees.

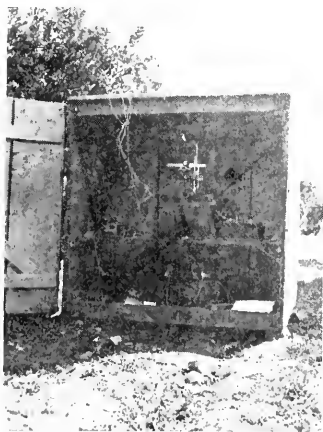
Some careful observers of orchard heating operations have noted for years that when heaters are placed in alternate rows between the trees, the greatest damage from low temperatures is always found in the rows in which no heaters are placed; in other words, "the dark rows are the cold rows." One fruit grower of Pomona, Cal., estimated he had fully 50 per cent more damage during the severe 1918-19 season in rows



Tower shelter for radiation instruments. It was found that practically all the smoke remained below the top of the shelter and showed practically no influence on the radiation.

only about 10 per cent during any considerable period of time, although individual readings showed a decrease amounting to as much as 25 per cent. (See figure 2).

Additional observations of the same kind were made at Medford, Oregon, during the spring of 1920, outside and under a dense blanket of smoke produced by open hard-pail heaters. The average decrease in the rate of radiation



Radiation instruments in shelter on ground.

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without heaters than in those in which the heaters were set.

This brought up the question as to the amount of benefit derived by the fruit and foliage from heat radiated directly from the fires, and steps were taken to find out exactly how important this radiated heat is in affording protection against frost damage.

When exposed to a clear sky, all substances steadily lose heat by radiation. Fruit and foliage exposed to the sky and also to the direct light of a burning orchard heater, will be losing heat by radiation to the sky and receiving heat by radiation from the heater. The amount of radiant heat received decreases very rapidly with increasing distance from the heater.

The simplest way to show the amount of radiant heat thrown off by an orchard heater is to note the distance from the heater at which it counterbalances the radiation to the sky.

Measurements of the rate at which heat is radiated from different types of orchard heaters, burning at different rates, were made by Professor H. H. Kimball, of the Weather Bureau. It was found that the radiation from a Scheu high-stack heater, burning at full capacity, if absorbed by the fruit and foliage of the tree, would be sufficient to offset the radiation to the sky up to a distance of 15 feet; if the lower section of the stack only was red hot, nocturnal cooling would be offset at a distance of about 10 feet. The radiation from a short-stack California heater, burning

at full rate, was sufficient to counterbalance outgoing radiation at a distance of about 8 feet.

With the amount of radiant heat received from an old style 5-quart open lard-pail heater at a distance of 10 feet considered as 100 per cent, other types of heaters radiate heat as shown below.

Heater	Rate of Burning	Radiation
Lard-pail	Full rate	100%
California (short-stack)	Full rate	125%
Adamsen (high-stack)	Low rate	148%
Adamsen (high-stack)	Full rate	315%
Scheu (high-stack)	Low rate	181%
Scheu (high-stack)	Medium rate	369%
Scheu (high-stack)	Full rate	499%

This table shows that heat radiated directly from the heater to the tree is of much greater importance with the high-stack heaters than is the case when other types are used. High-stack heaters should be placed in the orchard in such a position as to throw light on the greatest possible area of foliage.

The efficiency of an orchard heater is not determined by the amount of heat radiated directly from it. A large percentage of this radiant heat is lost directly to the sky without appreciable effect on the temperature of the air or of the plants. As radiant heat travels in straight lines and is completely absorbed or reflected by fruit and foliage, any fruit shaded from the heaters by leaves or branches can receive practically no direct benefit from the radiated heat. In the ideal orchard heater the heat units in the fuel would be entirely expended in raising the temperature of the air near the surface of the ground.

prize of \$25 presented by C. I. Lewis, organization manager of the Oregon Grower's Co-operative Association, was distributed to the four students scoring highest in judging plate and box displays of apples and in the identification of varieties. Winners were W. B. Murray, Grants Pass, Ore.; first; A. F. Gillette, La Verne Cal., second; R. H. Campbell, Amity, Ore., third; and H. L. Wilson, Hemet, Cal. In addition Mr. Murray as winner of the contest will have his name engraved on a silver loving cup which was presented to the show by A. B. Cordley, dean of the school of agriculture.

One of the chief benefits derived from the show is the training afforded students of horticulture in the preparation of exhibits but in addition to this the educational value of the show brings in many visitors from over the state.

Much of the success of the undertaking is attributed to the efforts of Prof. Walter S. Brown, chief of horticulture at the college, and his faculty staff consisting of C. E. Schuster, A. L. Peck, A. G. Bouquet, Henry Hartman, and E. H. Wiegand. The student committee was headed by E. L. Smith of Pasadena, Cal. as general manager assisted by C. E. Baker, Los Angeles, Cal.; W. B. Bollen, Portland, Ore.; R. H. Campbell, Amity, Ore.; A. F. Gillette, La Verne, Cal.; T. E. Hall, Yakima, Wash.; W. B. Hayes, Pasadena, Cal.; W. B. Murray, Grants Pass, Ore.; E. R. Shannahan, Dundee, Ore.; W. W. Weed, Beaverton, Ore.; H. L. Wilson, Hemet, Cal.; and R. C. Woodward, Victoria, B. C.

Ribbons were awarded the winners in the competitive exhibits of fruit and vegetables, C. I. Lewis acting as judge. Tiffin and Storz with fruit from the Oaco orchards at Amity, Ore., won first on three-tray displays of Grimes, Orley, and Spitzenburg. They were also awarded first place on single tray exhibits of Yellow Newtown, Northern Spy, King, and a tray of Patrick Barry pears.

Many students took ribbons in the classes they entered and winners of first places were G. Gifre, single tray of Northern Spy; E. L. Smith, single plate of Clairgeau pears; E. H. Hesseltnie, general plate display of walnuts; A. F. Gillette, Whittier supreme walnut; C. E. Baker, Placencia walnut. G. F. Bell won second on the Eureka walnut. A. F. Gillette was awarded first on a group display of almonds and plate exhibits of ne plus ultra, IXL, nonpareil and Texas prolific. M. Wharton, Garden Grove, Cal., was awarded first on Valencia oranges, Eureka lemons, Prolific walnuts, Eureka walnuts, Anaheim and Chinese Giant peppers.

Competition was keen in the vegetable section and winners of first awards were F. H. Hughson, Albany, Ore., on turnips and squash varieties; J. C. Leady, Beaverton, Ore., on cauliflower. F. B. Chase, Eugene, Ore.; H. C. McGinnis, Troutdale; and the Labish Meadows celery farm were winners in the celery classes. First award in the various classes of cabbage went to C. W. Kruse, Oswego, Ore.; D. P. Allen and George

The O. A. C. Horticultural Show Attractive

THE horticultural show presented annually by the horticultural department of the Oregon Agricultural College was larger this fall than ever before and the general arrangement and quality of the exhibits drew favorable comment from professional horticulturists and the interested crowds which saw it.

The show was unique in character, presenting a high degree of finish and artistic decoration often lacking in shows and fairs. Festoons of cedar boughs, hanging fern baskets, and quantities of chrysanthemums were used in decorating the large gymnasium in which it was held. A covering of moss fresh from the woods offered an attractive setting for the exhibits on the display tables.

The most notable thing in the section given over to fruit was a collection of 200 varieties of pears which, according to Prof. Walter S. Brown, chief of the division of horticulture at the college, was the largest and most comprehensive shown in the United States up to the present time.

A very complete exhibit of nuts including varieties from the tropics drew much attention but the most popular display was a collection of sub-tropical fruits assembled by F. A. Gillette of La Verne, Cal. Plates of avocados, figs, guavas, olives and other sub-tropical fruits seldom seen in the northwest were new to many and received much attention from the visitors.

District displays from California, Oregon, Washington and British Columbia were shown, first award in this class going to Moore and Hartman of Wenatchee, Wash., and second to R. C. Woodward of Victoria, B. C.

The section devoted to the vegetable gardening phase of horticulture was arranged under the direction of Pro. A. G. Bouquet. This department had a large and compelle display of vegetables, most of which came from Oregon and California. The high quality of these products was apparent even to the casual observer. A novel arrangement of exhibits on bracketed pannels was very effective in showing cauliflower, Swiss chard, celery and other bunch vegetables.

Another section of the show was composed of exhibits of canned goods, preserves, jells, jams and juices. Dried prunes and cherries bearing the labels of the new "Mistland" brand of the Oregon Grower's Co-operative association occupied a portion of this side of the room. Oregon and California canners occupied a large part of the space with their products.

Flowers from the college greenhouses filled the fourth section and vases of immense chrysanthemums neatly arranged on a green lawn of cedar foliage against a background of plants and flowers were admired by all who saw them.

A judging contest was carried on in connection with the show and a cash

Emker, Brownsmead, Ore.; and F. B. Chase, Eugene, Ore.

A. F. Gillette and the Aggeler and Musser company were winners in the sub-tropical entries.

Certificates of merit were awarded for the best exhibits of horticultural products as follows: the A. Rupert company of Portland, a display of canned goods, preserves, jams and jellies; Wadham & Kerr of Portland, a display of canned goods and exhibit of Monopole Brand jams and jellies; Starr Products company of Portland; Knight Packing company of Portland; Phez company of Salem; and the Brownsville Canning company of Lebanon, Ore. California was also represented in the display of canned goods, the Taylor Tamale company of Los Angeles, the Curtis Corporation of Long Beach, and the Ocean Shore Canning company of Half Moon Bay sending attractive exhibits of their products.

Controlling the San Jose Scale

San Jose scale was discovered in this country in 1871 in San Jose County, California. It was probably introduced from China. Now it is found in nearly every fruit growing country of the world.

San Jose scale is an insect. The scale proper is a waxy secretion covering the soft yellow sac-like body of the insect beneath. Adult insects appear in May and the females mature and begin giving birth to living young during the latter part of June.

A single female may give birth to about 400 young, and as the life cycle covers but a few weeks, there may be several generations in a year. In this latitude there are usually four. It has been estimated that the progeny from a single female would amount to the enormous total of 1,608,040,240. Knock off 50 per cent for error and we still have a pretty good argument for spraying.

The principal means of the scale getting from your neighbor's orchard to yours are, birds, wind and on the bodies of other insects. It is spread from one district to another on nursery stock.

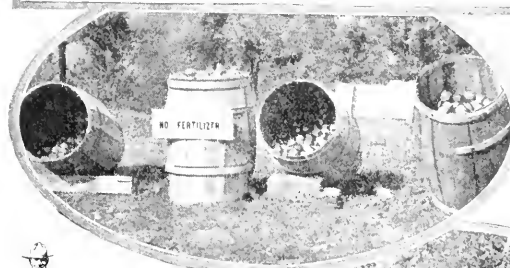
Control.—Through annual spraying with lime-sulphur solution testing 4 degrees in the tank. I might also add that the control is managed largely by the thoroughness. This spray may be applied in the fall after the leaves are down. In the winter, when the temperature is above freezing, or in the spring before the foliage appears. It is well to remember that the scale is no larger than the head of a pin; that the insect itself is well protected under the scale.

It is therefore necessary to hit each scale and not only hit them but thoroughly cover them. To do this requires powerful pumps, good nozzles and most of all, an experienced and determined man behind the gun, who can shoot straight and thoroughly cover the bark from the tips of the twigs to the surface of the ground.

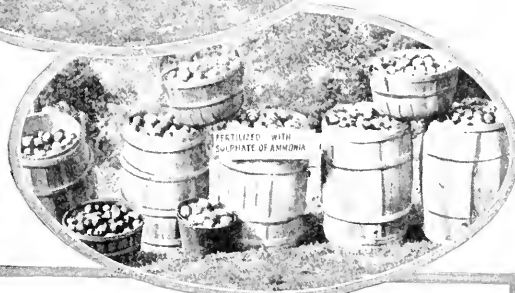


TOP-DRESSING TALK No. 1

Why you should fertilize your orchard



Upper photograph:—Average yield from unfertilized tree, Ben Davis variety.



Lower photograph:—Average yield from fertilized tree, Ben Davis variety.

Orchard Fertilization Experiment—1918

Everett Craig, Mt. Healthy, Ohio

Variety: Ben Davis.					Variety: Rome Beauty.				
Fertilizer Treatment	Grades				Fertilizer Treatment	Grades			
	Figs refer to diameters of apples.					Figs refer to diameters of apples.			
	Below 2½ in.	2½ in. - 2¾ in.	Above 2¾ in.	Total Picked		Below 2½ in.	2½ in. - 2¾ in.	Above 2¾ in.	Total Picked
No Fertilizer.	4 5 bu.	2 0 bu.	0 25 bu.	6 75 bu.	No Fertilizer.	0 375 bu.	1 0 bu.	5 0 bu.	6 375 bu.
Sulph. of Ammonia, 4 lbs. per tree.....	7 0 bu.	7 5 bu.	2 5 bu.	17 0 bu.	Sulph. of Ammonia 4 lbs. per tree.....	0 25 bu.	1 0 bu.	13 5 bu.	14 75 bu.
Gain.....	2 5 bu.	5 5 bu.	2 25 bu.	10 25 bu.	Gain.....	0 125 bu.	none	8 5 bu.	8 375 bu.
						(less)			

These tables give a very clear idea as to the value of fertilization in orchards. Fruit growers should study the results carefully, and draw their own conclusions as to why they should fertilize their orchards.

Fertilize Your Orchard With

Arcadian Sulphate of Ammonia

Nitrogen (usually termed ammonia) is the most important fertilizer element in fruit production. It is ammonia that promotes the vigorous wood growth so necessary for the formation of fruit spurs and fruit buds.

Arcadian Sulphate of Ammonia applied about two or three weeks before blossom time (100 to 150 lbs. per acre) will invigorate the fruit buds and increase the amount of fruit set. It will also tend to overcome off-year bearing of the apple.

The failure of fruit to set and the early falling of fruit is often due entirely to nitrogen starvation. In some sections an early application of quickly available nitrogen has increased the yields of fruit from four to ten times.

Arcadian Sulphate of Ammonia is for sale by all the larger fertilizer companies or their agents.

Be sure you get *Arcadian*.

For information
as to application,
write Desk 9.

The *Barrett* Company Agricultural Department

510 First National Bank Building, Berkeley, California

Western Nut Growers Discuss Their Problems

THE annual meeting of the Western Walnut Association held in Portland November 17 and 18 demonstrated that although the walnut growing industry received a severe set-back during the winter of 1919-1920, that growers are undismayed and that many new plantings will be made when the stock is obtainable. The lesson learned through the experience of the freeze last winter is that safety demands that walnuts be planted on the uplands rather than on the lowlands. In the Oregon walnut growing districts it was stated that very little winter injury developed in the upland sections and that the yield of nuts this year in many instances was the largest on record. It

was also shown by the data presented that filberts are extremely hardy and sustained little or no damage from the extremely low temperatures.

There were in attendance at the meeting about 100 nut growers from Oregon and the nearby states and many phases of value to the industry discussed. Among other important points brought out was the fact that experts in passing on the quality of nuts in the big Eastern markets have stated that the nuts grown in this section of the Pacific Coast are superior to those grown elsewhere and that there is an almost unlimited market for them provided that the cheap and inferior nuts from foreign countries can be kept from com-

peting with the home grown article. Even with this situation existing it was declared that one firm in the East had said that they could market annually 25,000,000 pounds of filberts of the quality grown in Oregon at profitable prices if they could get them.

Action taken at the meeting to aid the industry was the appointment of a committee to re-classify filbert varieties and with the view of obtaining a more satisfactory nomenclature for this nut on the Pacific Coast than now exists; the appointment of a legislative committee to take up the matter of a tariff on imported nuts and other matters and a resolution asking the Oregon State Highway Commission to change the name of the Capital Highway to the Walnut Highway and to plant walnut trees along it. The county commissioners of the counties through which the highway passes and the officials of the various towns it touches are requested by the resolution to co-operate toward this end.

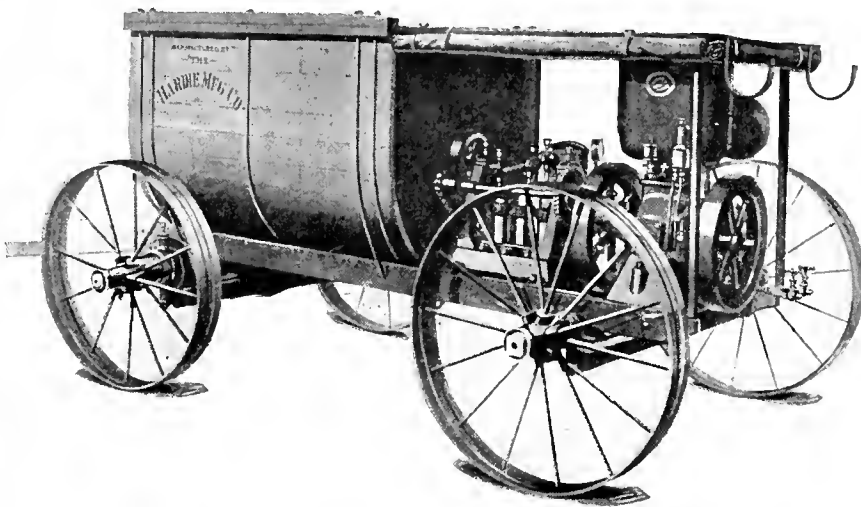
J. C. Cooper, of McMinnville, Oregon, the veteran president of the association refusing to longer serve in this capacity, H. A. Henneman, of Portland was elected to this office. The other officers chosen are: Ferd Groner, Hillsboro, vice-president for Oregon; A. A. Quarnberg, Vancouver, vice-president for Washington; Ben F. Doris, Eugene, Oregon, secretary-treasurer.

Those who delivered addresses to the convention were: Chas. Trunk, Dundee, Ore., "The Development of the Walnut Orchard"; A. M. Gray, Portland, Ore., "The Commercial Filbert Grove of the Pacific Northwest"; Knight Percy, Salem, Ore., "Chestnut Growing"; D. F. Fisher, Plant Pathologist U. S. Dept. of Agriculture, "Winter Injury to Fruit and Nut Trees"; Ferd Groner, Hillsboro, Ore., "Lessons From the December Freeze"; R. A. Booth, State Highway Commissioner, Eugene, Ore., "Nut Bearing Trees Along Highways"; C. I. Lewis, Organization Manager Oregon Growers' Co-operative Association, "Some Observations on California Nut Culture and Lessons We Here in the Northwest Can Learn Therefrom"; Ben F. Doris, Eugene, Ore., "Planting a Filbert Orchard"; A. A. Quarnberg, Vancouver, Wash., "European Investigations"; H. A. Henneman, Portland, Ore., "Filberts"; W. S. Brown, Chief Division Horticulture, Oregon Agricultural College.

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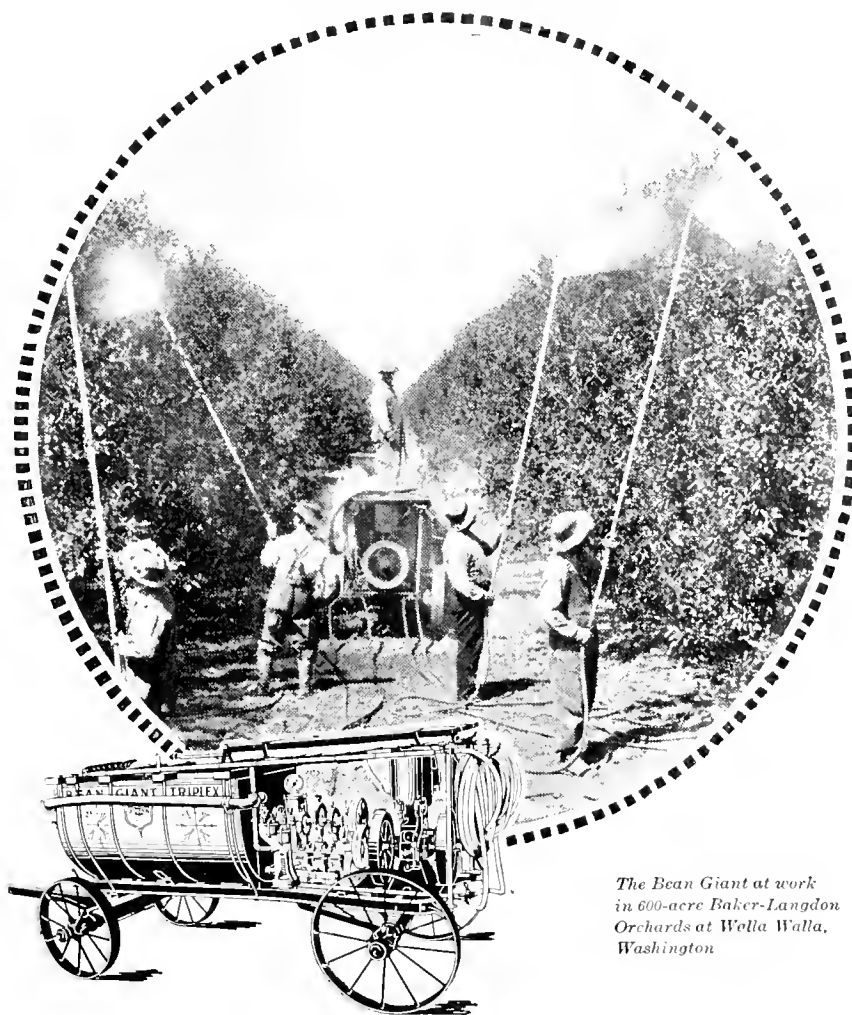
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Ripening and Storing of Bartlett Pears

By J. R. Magness, Plant Physiologist, Horticultural and Pomological Investigations,
U. S. Bureau of Plant Industry

PERHAPS there is no major fruit crop grown in the Pacific Coast States that offers greater difficulty in the handling and marketing than does the Bartlett pear. This is due to its being a highly perishable fruit, to the fact that there is a wide variation in the keeping quality of fruit from various sections, and to a misunderstanding on the part of many handlers of the effect of such factors as time of picking, temperature at which stored, etc., on the keeping quality and dessert quality of the ripened fruit.

During the summer of 1919 a series of studies was made to determine the changes taking place in Bartlett pears as they develop on the tree and as they ripen after being picked. The effect of storing the fruit at different temperatures was also studied. Fruit was secured from typical orchards of the Sacramento River district, and from Suisun, Cal., from the Medford district, Oregon, and from Selah in the Yakima Valley, Washington. Pickings were made three weeks before the commercial season opened in each of these districts and at intervals thereafter until after the last commercial fruit had been removed from the trees.

Chemical analyses for sugar, acid, starch and dry matter were made when fruit of each picking was removed from the tree and again when this same fruit was full yellow ripe and in prime eating condition. The fruit was analyzed after being held in storage at 70, 45 and 30 degrees F.

It was found that there is a progressive increase in the sugar content of the fruit from early summer until after the end of the commercial season. Between the time of the first and of the last commercial pickings the sugar increased from an average of about 6 per cent to an average of about 8 per cent of the weight of the fruit. Between the time of picking and the time the pears are full yellow ripe there is a further increase in sugar due apparently to the change of starch and similar materials into sugar. Early picked pears, which contained about 6 per cent of sugar when first taken from the trees, contained about 8 per cent when soft ripe, and pears picked toward the end of the picking season and containing about 8 per cent sugar when removed from the tree contained about 10 per cent when full yellow ripe. It is thus apparent that to obtain the fruit richest in sugar it should be left on the tree as long as possible.

The total amount of sugar found in the fruit at the various stages of development was very nearly the same in pears from the different regions studied. This did not hold true for acids, however, as a considerably greater amount of acid was found in the northern grown fruit. Since acid and sugar are equally important factors in determining the flavor of the fruit, the greater amount of acid in the northern fruit probably accounts for the idea preva-

lent in pear trade circles that the California pears contain more sugar.

If the pears were held from the time of picking until soft ripe at ordinary temperature, rather than in cold storage, there was an increase in the amount of acid in the fruit during that time. Pears ripened at cold storage temperatures, however, contained about the same amount of acid when ripe that they did at the time of removing from the tree. There was about 1 per cent more sugar in the fruit ripened at 70 degrees than in that ripened in cold storage at 40 degrees.

Fruit ripened at 70 degrees was richer and better flavored than that ripened in cold storage. Fruit held at 30 degrees for two to three months, then taken out while still hard green and ripened at a temperature of 70 degrees, was richer in sugar and much higher in quality than that held until ripe at temperatures of 40 to 45 degrees.

Cold Storage Temperatures for Bartlett Pears.

There is a widespread belief among handlers of Bartlett pears, particularly in California, that this fruit, when put in cold storage, should be held at temperatures of 35 degrees to 40 degrees, or even higher. A careful study of the response of the fruit under different temperatures has shown this belief to have no foundation. Pears stored at 40 degrees, if put in storage as soon as picked, will last from three to six weeks, depending upon the degree of ripeness at the time of picking and the locality in which they are grown. If allowed to ripen at this temperature they will be lower in sugar and of poorer quality than if handled in any other way.

Storing at about 30 degrees gave by far the best results for Bartlett pears. Fruit picked while still hard green and held at this temperature from six weeks to three and one-half months was to all appearances in this condition when removed from storage and required five to six days after placing in a room at 70 degrees before it was in prime eating condition. The quality of this fruit when ripe was much higher than that of fruit stored until ripe at 40 degrees. Furthermore, the period that it is possible to hold the fruit is much longer.

As the Bartlett pear acreage on the Pacific Coast increases, the season, both for fresh shipping and cannery or drying trade, must be lengthened. Cold storage must be utilized more and more. If the following rules for storage are closely adhered to, a product of excellent dessert quality, which may be stored for a considerable period, will be obtained.

1. Leave the fruit on the tree until it has attained a high sugar content. This is not always possible for fruit intended for fresh shipment, but for canning or drying it is especially important.
2. Remove the fruit to cold storage

at once after picking from the tree. Every day at high temperatures after the fruit is picked will shorten its storage life very considerably.

3. Cool the fruit to 30 degrees as quickly as possible. Fruit does not receive the benefit of the low temperatures until it is actually at those temperatures. Use a pre-cooling room where available to rapidly cool the fruit to the refrigerating temperature.

4. Hold the fruit at 30 degrees. A few degrees below this temperature the fruit is liable to injury and a few degrees above will shorten very considerably the time it is possible to hold the fruit.

5. When the fruit is desired for use, remove it from cold storage and allow it to ripen at temperatures of 60 to 70 degrees. This will give a higher quality produce than will storing the fruit until ripe at temperatures of 35 to 40 degrees.

Bartlett pears, picked when well matured but while still hard green and handled according to these suggestions, will readily last two to three months in storage, and in many cases may even exceed this time very considerably.

The data upon which this article is based and a more complete discussion of the results are given in a paper entitled "Investigations in the Ripening and Storage of Bartlett Pears," Journal of Agriculture, Research, Vol. 19, No. 10, August 16, 1920.

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Potash arriving at an American factory

Plenty of Potash

AFTER five years of Potash famine there is now plenty of Potash to be had at prices that will permit it to be used at a good profit.

When Potash in mixed fertilizers was sold at five dollars per unit, everybody exclaimed that the price was "prohibitive". This was a state of mind. As a matter of fact, when the records of long continued experiments east, south, and west, were carefully gone over it was found that there were plenty of cases where the crop increase from the use of Potash on corn, wheat, oats, cotton, tobacco, potatoes, vegetables and fruit returned over five dollars per unit, even valuing the crops at prices current before 1914.

Now prices of Potash are less than one-half of these "prohibitive prices" and prices of farm products are still high enough to make the purchase of the five to ten per cent. Potash fertilizers a very profitable investment when yields alone are considered.

But this is not all. The shipping and keeping quality of many of our truck, fruit and special crops has suffered from lack of Potash.

Plant diseases have increased for the same reason.

Our best lands have been overworked to the limit and need restoration.

The fertilizer manufacturer who really has the foresight to understand that he serves his own and his customers' interest best by

furnishing what his community really needs will return to the formulas that were found most profitable for his community before the Potash famine upset things. Indeed this is putting the case mildly, for provision should be made not only to restore the old high Potash formulas, but to use additional Potash to restore the drain on the soil during the past five years.

We never advised the use of Potash on soils where we had reason to believe it would not prove profitable, and never shall do so.

There is not a single crop on which Potash has not been found profitable on many types of soil.

In the readjustment period when farmers must use every means to assure success it is of the utmost importance that they should not be turned aside in their efforts to buy fertilizers with a reasonable (five to ten) per cent. of Potash.

Potash Pays

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It takes time to produce and ship Potash and large stocks are not carried at Potash works.

Therefore it is imperative that you notify your dealer at once what brands of fertilizer you will require and that you should not be induced to change your order on any claim that the right kind of goods cannot be secured. Stick to it and you can get what you know you want.

SOIL AND CROP SERVICE, POTASH SYNDICATE

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Orchards of England Show Heavy Decrease

SOME 10,000 acres in top fruit alone (apples, pears, plums, cherries, etc.) will be required to be planted in England to bring the area of productive fruit plantations and orchards back to the pre-war acreage, according to the Ministry of Agriculture. The estimated acreage, based on the returns for the years 1913 and 1919, were 243,609 and 232,378, respectively, showing a decrease of 11,231 acres. Apples went from 160,357 acres to 147,401, a decrease of 12,956 acres.

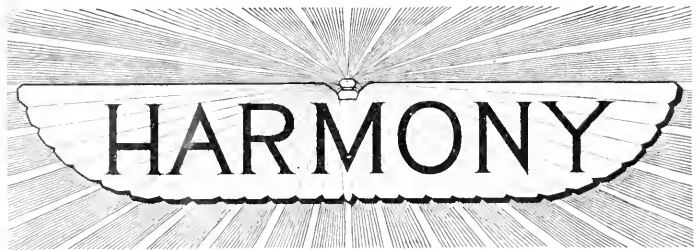
In soft fruits there was in the same period a reduction of 18,139 acres (from 76,857 to 58,718 acres). The Ministry of Agriculture has not yet tabulated returns relating to top fruit for 1920, but for soft fruit (strawberries, raspberries and currants) the statistics show that the downward movement of war years has been arrested and that the area under such fruit has been extended from 58,718 in 1919 to 60,318 acres for 1920. There remains, however, a shortage of 16,539 acres for soft fruit as compared with the 1913 acreage.

Owing to the fact that supplies of fruit trees are short, it is not likely that any progress can be made in the immediate future, although land is available for the extension of fruit planting. In view of these facts, American nursery stock should find a good market in Great Britain. English fruit growers usually plant by the middle of October. In early, dry seasons planting may be done sooner, because the wood is ripe; in wet seasons it is done not later than the end of November. The Ministry of Agriculture is taking considerable interest in the question of fruit tree planting on small holdings and has already made some arrangements for the supply of a limited number of trees during this season, and in the autumn of 1921.

Fall and Spring Tree Planting

While some authorities advise planting fruit trees in the spring many others are of the opinion that it is much better to plant in the fall. In fact horticulturists of wide experience state that trees properly planted in the fall will in a few years show a more sturdy growth than those planted the previous spring, and that some varieties of trees such as the cherry get a much better start if planted in the fall. In planting cherry trees they should not be set in clay soil that will hold water. In fact an important point in planting cherry trees is to place them on a slope that will give them good drainage and sufficient elevation to protect them from frost.

In planting in the fall the work should commence as soon as dormant trees can be obtained and can be continued until the soil commences to freeze. The planting, however, should not be done when the ground is too wet to be well packed around the roots.



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Spraying With Bordeaux

By Leroy Childs, Entomologist, Hood River Experiment Station

Apple tree anthracnose is causing more damage in apple orchards of Oregon than any other disease. In order to effectively combat this disease, growers must be more vigilant than they have been in the past. The Bordeaux spray should be applied to every orchard, and to be effective it must go on as soon as possible. Every grower should arrange his work so that the spray machine will follow up the picking as fast as the fruit is removed. Don't plan to do this, but do it. Early rains may have caused infection to take place, but this is only a fraction of what will follow if the spray is not applied. The approved way of mixing Bordeaux follows:

Manufacture: Use wooden containers for dissolving the bluestone formula: Six pounds bluestone, 6 pounds lime (stone of best grade), 50 gallons of water.

Stock solution: Take a 50-gallon barrel of water and suspend near the top of the water a grain sack containing 50 pounds of bluestone, it will dissolve in about an hour. Take 50 gallons of quick lime and slack carefully, constantly stirring, adding water as needed to prevent it from becoming dry and burning. When thoroughly slackened add water to make 50 gallons. These stock solutions then contain 1 pound each of the original material to 1 gallon of water.

Method: We have been placing the materials direct into the tank diluted with water, but the following procedure is believed to give a better mixture. It is as follows: (Use the "1-pound to the gallon stock solution" mentioned above). 1. Take 6 gallons of the copper sulphate solution and add 19 gallons of water. 2. Stir up the stock solution of the milk of lime and take 6 gallons and add 19 gallons of water. Pour together slowly into another barrel (it takes two men to do this in order that the amounts may be kept in equal proportions) and stir thoroughly. It will be found more convenient to prepare the two solutions on an elevated platform and run them simultaneously from the dilution tanks into the spray tank. Pour the mixture into the spray tank, start the agitator and fill with water. These proportions may be mixed in larger units, but remember to keep the proportions the same.

I've plenty of material while spraying and be sure to cover the large limbs thoroughly. Bordeaux shows up nicely on the tree and it is very easy to note whether the spraying is being done well or not.



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These fine heavy-bearing trees were planted in 1897, every tree being set in a hole blasted with



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Write for free book, "Development of Logged-off Lands," which has complete details on tree-planting and other farm work that can be done profitably with Du Pont Explosives.

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PEARCY BROS., Salem, Oregon

BETTER FRUIT

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of Modern Fruit Growing and Marketing.
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Tree Surgery.

Considering the price and the difficulty in securing nursery stock to replace trees that have been injured, tree surgery is becoming a very important factor. In calling attention to this fact experts connected with the United States Agricultural Department state that up to the present time tree-repair work has not received the recognition and approval from tree owners that it deserves. Continuing, these experts say:

"This may be due at times to unfavorable experiences with dishonest or ignorant tree surgeons, at other times to the reluctance of the owners to spend much money in preserving their trees, or from their ignorance of the benefits that may result when tree-repair work is properly done.

"Reliable tree surgeons are doing much in a practical way to educate the public as to the benefits of tree-repair work. A few states have laws regulating tree-repair work on a commercial basis.

"Tree owners are urged to remember that the necessity for tree-repair work 15 or 20 years hence may be reduced materially by promptly attending to the fresh injuries of today.

"Most persons can, at least with a very little preliminary practice on the simpler types of work, undertake ordinary tree surgery provided they are familiar with the use of a gouge and mallet, a saw and a paint brush. A steady head and ability to climb will be necessary for work in the top of the tree.

"A badly diseased or injured tree should be removed and replaced by a healthy one unless there is some very special reason for trying to preserve the tree.

"Two axioms for tree-repair work that should be borne in mind constantly are: That prompt treatment of freshly made wounds is the surest and most economical method of preventing disease and decay in the future, and that all wounds made in tree surgery should be cleaned, sterilized and protected from infection just as thoroughly as in animal surgery, and for the same reasons."

The orchardist should always bear in mind that his trees are his stock in trade; his producing element in other words; that it takes years to bring them into bearing on a paying basis and that watchful care at the proper time will avoid a loss that cannot be made up in after years. Where the injury is slight it may be taken care of by the orchardist himself, but bad cases require the attention of a trained man in the profession, and it pays to have expert advice.

The Nut Growing Industry.

Due to a large extent to the thorough investigations made by government and state experts and the experience of growers this year it is shown that it will not be necessary to call a halt in the rapidly growing walnut industry in the Northwest on account of winter injury which was a more or less predominant feeling among growers last spring. These investigations show that the greatest injury was sustained in districts where the sites and soils were not best adapted to the growing of walnuts and that the trees most easily affected were those that were devitalized. Another feature is that damaging temperatures such as visited the Northwest during the past winter are of rare occurrence and are part of the hazards of growing nuts and fruits.

The recovery of trees in many orchards and the fact that walnuts on the uplands were very little injured and bore large crops this year coupled with the experience growers gained from the freeze generally has put new life into the industry rather than injured its advancement. The knowledge also that the demand for nuts grown on the Pacific Coast leads all others in the big markets is inducing many to plant new orchards while a number of those already in the business are contemplating enlarging their acreage. In fact with 10,000 to 12,000 acres of walnuts and filberts planted in the Northwest nut growing is taking a prominent place with the other orchard enterprises of this region, and time only is necessary to see the annual tonnage assume large proportions.

Bulge or Flat Pack.

The attempt of the railroads entering the Florida fruit districts to have the bulge pack abolished is commented on by the Fruit trade Journal as follows:

"Undoubtedly the sentiment of growers and the tendency of the present is toward the bulge pack. By its adoption less cars will be required to move the crop than otherwise; because more fruit can be put in each box than in the package which the Atlantic Coast Line Railroad seems to favor. Its use will also mean less decay in normal times inasmuch as the fruits do not shift or rub against each other in a tightly packed box as in the case in a flat packed container. Not even those who favor the latter package can deny that after citrus fruits are packed a few days, what at loading time was a flat pack becomes a slack pack and presents that appearance at destination as a car of oranges from Florida is usually six or seven days in transit. What is called a 'bulge pack' seems like an overfilled box at loading time, but after being a week or so in transit it proves to be nothing more than a box of full measure. The vibration of the car during its trip to northern markets reduces the bulge to merely full measure and that is what buyers expect. If they fail to get it, the growers will have to accept a reduced price for their fruit. It is not difficult to see that a

flat pack means a slack box, or an improperly filled one at points of destination. The jobber who is a connecting link between the producer and consumer, dislikes purchasing a slack packed box of fruit because such a package when turned over to the express man, or the truckman, will not reach the consumer in good condition as a result of the shifting of the fruit around in the box. Nearly all growers, jobbers and leading receivers share this view. Upon the necessity of reducing the damage to Florida citrus fruits in transit and making the problem of transportation as easy for the Atlantic Coast Line Railroad and other carriers as possible, there is general concurrence, but we doubt if the general use of the flat pack will bring about this desired result, or be conducive to the permanent good of the citrus industry."

At a meeting of the Florida citrus growers held at Orlando, in conference with the railroad officials so many arguments were brought to bear for the retention of the bulge pack that it is believed now that there will be no further objections to it. This is as it should be, as years of experience have shown that it insures a satisfactory box package to both dealer and consumer.

Spotted Apples.

Expert investigation into the cause of the spotting of apples, especially of the Newtown variety this fall, has resulted in the decision that either the August bordeaux must be eliminated or some other agent than copper sulphate must be used, says the Hood River Glacier. Contrary to the persistent conviction of some ranchers, the tiny red spots that covered a number of their Newtowns this fall are not the result of scab, but have been definitely traced to a combination of two causes, the unusually wet season and the copper sulphate in the bordeaux spray. Leroy Childs, of the Hood River Experiment Station, says there can no longer be any doubt about this, for it is now recognized that spotting to a lighter degree takes place under adverse weather conditions even in orchards in which bordeaux had not been applied in August.

The spotting is explained by Professor H. P. Barrs, of the O. A. C. Experiment Station, who says that the rain and copper together had caused a drying out of the lenticles of the apples, with an eventual breaking down of the tissues. Wherever this breakdown of the tissues occurred a red spot developed. The reason why the apples in some orchards appeared to be more seriously damaged than in others is explained by the relative strength of the copper sulphate in the spray used.

Filbert Propagation.

Time and cost of getting filbert stock for new plantings can be saved by layering the shoots that arise from the base of the tree during the first summer. Well-rooted plants have been obtained the first growing season in trials at the Oregon Agricultural College and

are ready for setting in the orchard the next year. This is a saving of an entire year over present practices, from the beginning of propagation till the stock is ready for the orchard.

Gassing the Peach Tree Borer

The result of what is known as the para-dichlorobenzene treatment for the eradication of the peach-tree borer lead experts of the United States Department of Agriculture to believe that a practical means has finally been found of ridding orchards of this disastrously destructive pest. Previously the only effective method of fighting the borer was by removing the soil around the base of the tree and digging the grubs out of their galleries with a knife. It is estimated that the borers have done \$6,000,000 damage a year than that \$2,000,000 a year has been spent fighting them.

The para-dichlorobenzene method was first used extensively by orchardists in 1919. It consists in sprinkling fine crystals of the insecticide on the soil around the base of the infected tree and covering with earth to hold the gas. The substance is highly volatile and forms gas when the soil is between 74° and 80° F. This gas is five times heavier than air and sinks down through the soil. It is highly effective against the borer; and a pound of the insecticide, costing not more than 25 cents, is sufficient for 8 or 10 trees. The labor is scarcely one-third of that formerly required. The saving therefore is great.

This year the para-dichlorobenzene process has been used extensively in the Georgia peach belt, some localities buying as high as 50,000 pounds and large individual growers as high as 2 tons each. Growers declare that it is one of the greatest accomplishments in the history of the department, comparable to the self-boiled lime-sulphur treatment for control of brown rot and scab of the peach.



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NUT MARGARINE

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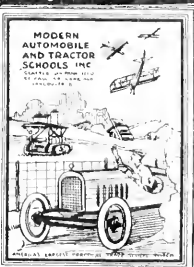
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Preparing Soil for Strawberries

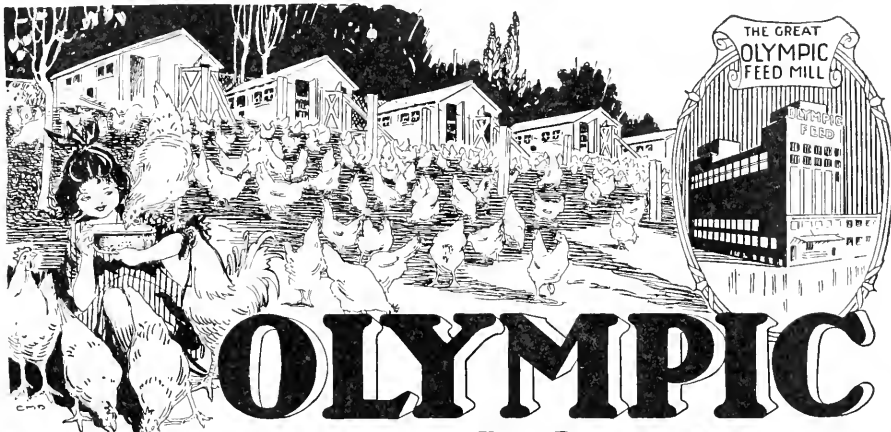
In starting a strawberry patch one of the most important features for the prospective grower to remember is to have the soil in the right condition before setting the plants. The preparation of the soil for strawberries should usually begin a year or two before the plants are to be set, unless they are to be set in soil which has received the proper cultivation in growing other crops. Newly plowed sod land should not be used. The grass roots often prove objectionable and there is also the possibility of injury to the plants

from insects. If the soil is deficient in humus a green manure crop should be grown, such as clover or some other legume, or stable manure where available should be applied.

Setting the plants so that the crowns are even with the surface of the ground after the soil has been packed about the roots, and making the soil very firm about the plant are important. If the soil is not properly firmed about the roots, air gets to them and they are likely to dry out, resulting in a feeble growth or none at all.

In localities subject to late spring frost a site for strawberries should be

somewhat elevated, as cold air settles in low places and frosts occur there more frequently than on the elevated spots. Strawberries thrive best on soil which is naturally moist, but not wet. Plants on wet soil usually make very little growth in the summer and are likely to be killed when the ground freezes in the winter. Therefore the site chosen for strawberries should be well drained. Ordinarily a site having a gradual rather than a steep slope should be selected. By choosing different slopes it is possible to vary the period of ripening several days, as the berries having a southern exposure



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Make a Healthy, Productive Flock

POULTRY feeds must contain the proper ingredients, correctly blended and accurately balanced, to produce maximum results. That is why every comparative test proves OLYMPIC Poultry Feeds to be without either equal or superior.

THE PORTLAND FLOURING MILLS CO.,

Sebastopol, Cal., Sept. 22, 1920

Gentlemen:

I have checked up my egg record for the first three weeks of September, during which time I used your OLYMPIC SCRATCH FEED and OLYMPIC EGG MASH, and I find my flock showed a remarkable increase, the average of the last three days of the test over the first three showing 137 1/3 eggs per day increase, or 70% gain. My hens are also laying the largest eggs I have ever had, weighing over 26 ounces to the dozen. The pullet eggs went to 19 and 22 ounces on the OLYMPIC feeds. This I call remarkable.

I have been breeding for forty-five years and exhibiting for thirty-five years.

I am delighted with your special molt and spring laying mash.

Enclosed find my full egg record for the twenty days, September 1st to 20th.

Yours very truly,

WM. HACON.



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The drying of buttermilk for the various OLYMPIC Feeds, is proven the only practical method of introducing this most valuable ingredient into prepared feed. It does not become rancid when shipped or stored, nor lose any of its desirable qualities. The water has simply been removed, leaving the buttermilk in highly concentrated form.

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BABY CHICK SCRATCH consists of small, uniformly ground grains suited for the critical first three weeks' feeding.

GROWING CHICK SCRATCH—Of slightly larger grains for the youngsters up to 8 or 9 weeks of age.

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CRATE FATTENER tears down the muscles and builds up the flesh; making the meat whiter, sweeter and more tender in the shortest possible time.

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will ripen earlier than those located on a cooler northern slope.

Strawberries not only have a wide climatic adaptation but may be grown successfully upon almost any type of soil, from coarse sand to heavy clay, provided it is well supplied with moisture and at the same time well drained. When early fruit is desired sandy soil is often chosen, since the berries ripen somewhat earlier than on clay soil.

Pruning the Grape

In pruning the grape some successful vineyardists do not prune at all until the latter part of winter or early spring. In this case the pruning is done so as to leave only the buds wanted to bear fruit for the coming season. Grape vines, however, may be safely trimmed any time between the falling of the leaves in the fall and the beginning of sap flow in the spring.

In general practice the pruning of grape vines is usually commenced as soon as the leaves drop in the fall. If the wood is to be used in starting new vines, it is best to cut it from the vines, before freezing weather comes. When pruning in the fall or during the winter, the vines should not be cut back to the bud or buds that are wanted for fruit.

A few weeks before the buds start the vines should be gone over and the extra buds cut off. The second pruning should be done before the cold weather is over for if put off too long the sap will ooze from the wound and injure the vines. Should the vines be pruned in the fall down to the buds wanted for fruit, some of them might be winter-killed and the amount of fruit expected cut short.

If vines are laid down and protected during the winter, the pruning may be all done before they are laid down in the fall.

Tractor Depreciation

Many farmers look upon the tractor proposition with distavor because of a mistaken idea of excessive depreciation, says a writer in discussing the value of the tractor. Tractor depreciation is figured at 20 per cent per year, while the average depreciation upon draft horses will not exceed 10 per cent.

A standard rate of depreciation cannot be determined, for the care or abuse which a tractor gets is the one determining factor, and matters of care are purely individual.

We have known of many tractors which went into the scrap heap at the end of three years. But there are just as many and more which have kept on year after year for eight, ten or twelve years. When sold, the depreciation of all was figured alike. When they got into the hands of users, depreciation became a personal problem, and one farmer had to charge off more than 30 per cent a year, while his neighbor charged off only 10 per cent.

Investigation of the 30 per cent class will invariably show that the owner knew very little about the care of his machine; that he changed the oil when

he thought of it and that his tractor stood out in the open most of the time. This fresh air treatment has been found quite successful for humans suffering from tuberculosis, but it has never been known to add to the life of a piece of farm machinery.

On the other hand, the same farmer will spend an hour or more each day keeping his horses fit. Metal and horse-flesh are so dissimilar that he fails to recognize the tractor's need of intelligent care, and when it fails he blames the dealer and the maker for his loss.



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"how much difference there is in the strength and durability of boxes. We've solved this problem, though, by always getting ours from the Bloedel Donovan Mills. You can't beat them for quality.

Standard apple boxes, crates and cases of selected material, carefully constructed.

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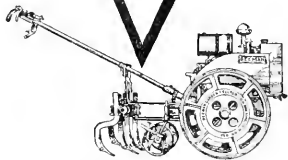
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Ideal for the rapid cultivation of berries.
A necessity for any fruit grower.

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Now, if you go over to his neighbor's place, you will find the reason for his success just as apparent. His tractor is clean, the oil is fresh, bearings are tight and when it isn't at work he keeps it in a weatherproof shed or puts a cover over it to keep out the rain. His horses were profitable and his tractor is even more profitable.

Why Trees Fail to Grow

The reason why trees fail to grow is usually blamed on the nurseryman, but more often there is some other cause. Trees are subject to more or less hardship between the time they are standing in the nursery rows and the time they are again set in the ground. Tracing the history of the tree through the several steps in its digging and transplanting, we find that it may have been injured or broken in digging. After removal from the ground it may have received more drying wind and hot sun than was good for it. The tree may have been packed too wet or too dry, or the materials used may have given off heat, to the injury of the tree. In being transported it may have been placed against hot pipes or against some other heated object. It may have been delayed in transit, or the purchaser may have neglected them on their arrival, exposing them to the sun and wind.

The greatest cause of loss to trees, however, is stated to be in the work of planting. When trees are dug nurserymen frequently leave about three-quarters of the roots in the soil. The tops, therefore, must be cut back hard. In planting the young trees they should not be set in soil that is too wet or too dry. If the soil is dry water should be used in planting, a bucketful or more when the hole is three-quarters of the way filled up with soil. Most important of all, the soil should be tightly packed around the roots by hand. Tight packing is one of the essential things to successful tree planting.

The Honey Bee.

There is no creature by which man has surrounded himself that seems so much like a product of civilization, so much like the result of development on special lines and in special fields, as the honey bee. Indeed, a colony of bees, with their neatness and love of order, their division of labor, their public spiritedness, their thrift, their complex economies, and their inordinate love of gain, seems as far removed from a condition of rude nature as does a walled city or a cathedral town.—*John Burroughs.*

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Northwest Fruit Notes From Here and There

OREGON.

The total apple crop of Oregon for 1920 as estimated by F. L. Kent, Field Agent for the Bureau of Crop Estimates, is now placed at 3,471,000 boxes, so that earlier estimates of 60 per cent of last year's crop for this year still hold good. The report states that owing to the unfavorable weather conditions during the earlier part of the picking season, picking was more expensive than usual, growers paying from 7 to 8 cents a box as compared to pre-war prices of 3 to 4 cents per box.

Prunes packed in cartons with an attractive Oregon label are being shipped to the big Eastern markets by the Phez Company of Salem. It is believed by the company that this form of package will prove very attractive to prune buyers and that they will find a ready sale.

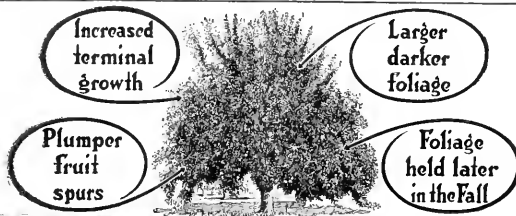
The Eugene Fruit Growers' Association this year packed out 825,000 pounds of Bartlett pears, more than doubling the pack of last year according to figures recently made public. It is believed that nearly 1,000,000 pounds of pears were packed in the Eugene district this year.

Although handicapped by bad weather harvesting the apple crop of Hood River was completed successfully. Up to the middle of November the Apple Growers Association had received approximately 500,000 boxes and over 200,000 boxes had been delivered to other apple handling concerns.

In The Dalles-Hood River district the Libby, McNeil & Libby Company recently opened the market for canning apples by offering growers \$12 per ton. The company requires that the fruit shall be 2½ inches in diameter or larger.

The Hood River Glacier notes that apples are being shipped out of the Hood River district by parcels post at the rate of a car and a half a week. The bulk of the shipments it is stated go to interior, central and eastern Oregon points and reach their destination on motor stages.

Statistics recently prepared show that Jackson county leads Oregon in pear acreage and stands second in apple acreage. According to the figures given out this county has 5264 acres of bearing pear trees and 2767 acres of non-bearing trees. Douglas county, with 785 acres, has the second largest pear acreage in



The Complete Dormant Spray

—makes vigorous fruit trees

THE FACT that many big commercial orchardists use Scalecide year after year can mean only one thing—that the use of Scalecide pays. These men must protect heavy investments; they must get results. They know every kind of spray material, yet they use Scalecide because it produces results which no other dormant spray can produce.

The invigorating effect of Scalecide is shown in the orchards of Tyson Bros., Flora Dale, Pa., now a part of the American Fruit Growers, Incorporated, where one York Imperial orchard has been sprayed with Scalecide for fifteen years. This orchard, when 18 years old, bore a crop of 30 bushels per tree. This was the tenth consecutive crop, each larger than the preceding.

Scalecide Requires Less Labor

One barrel of Scalecide, which makes 800 gallons of spray, will cover, until they drip, as many trees as three and a half barrels of lime-sulfur, which make 1600 gallons of spray. And of course you can apply 800 gallons of Scalecide with much less labor than 1600 gallons of lime-sulfur.

Scalecide Is Pleasant To Use

Scalecide is soothing, healing and antiseptic to the skin of man or beast, whereas lime-sulfur is caustic and disagreeable. Scalecide does not injure even the eyes. It does not corrode the spray pump nor clog the nozzles, and being an oil, it makes the pump run easier and last longer.

Avoid Disappointment—Order Scalecide Now

If there is a dealer in your section, ask him to reserve enough Scalecide for you. If there is no agent near you, write for our booklet, prices and guarantee, and give us the name of your dealer. Use the coupon below. Address Dept. 25.

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SCALECIDE

THE COMPLETE DORMANT SPRAY

"Makes a Tree Outgrow Its Troubles"

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B. G. PRATT COMPANY, 50 CHURCH STREET, NEW YORK CITY

Gentlemen: Please send me prices, copy of Guarantee and free booklet on Scalecide, "Figuring the Cost of Spraying." I have.....

bearing trees.....young trees. I have been using.....barrels of.....(number).....(kind of dormant spray)

My dealer is.....(Name).....(P.O.).....(State)

Name

P. O.

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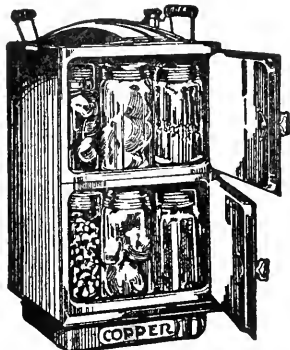
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No. 20—Conservo, 21½ inches high, 11¾ inches square; 4 removable shelves; 2 pans; cooks for 3 to 15 persons; holds 14 one-quart jars for canning. No. 3—Conservo is 13½ inches high; 2 shelves; 1 pan; cooks for 2 or 3 persons; holds 6 one-quart jars for canning.

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the state and Hood River is third with 385 acres. In apple acreage Hood River county leads the state with 8,827 acres of bearing apples and 1,619 acres in non-bearing trees.

The commercial club at Oregon City is being urged to take up a campaign there to stimulate the planting of loganberries. The acreage there is now 100 and the suggestion is to bring it up to 500 during the coming year.

The Department of Entomology of the Oregon Agricultural College Experiment Station has recently issued a fruit growers handbook of apple and pear insects compiled by A. L. Lovett and B. B. Fulton. The little volume is full of valuable information for the grower and can be had by application to the college.

Final installation of new machinery in all its packing plants is announced by the Oregon Growers Cooperative Association, with the exception of Scotts Mills where there has been some delay. The new processing machines are of the very latest type. R. C. Paulus, sales manager, announces. They are capable of giving prunes a more thorough washing and they also carry the prunes longer in the steam permitting a higher temperature. During the past season the heaviest packing was done at the Sutherlin and Salem plants on account of delay in shipment of machinery which interfered with operations. The plants already in operation with the new machinery are located at Salem, Dallas and Yamhill. Installation of new machinery is under way in the packing plants at Forest Grove, Myrtle Creek, Dallas, Riddle, and Scotts Mills.

J. O. Holt, packing manager of the Oregon Growers Cooperative Association with headquarters at Eugene, announces that the chemist at the Eugene plant is putting out an apple syrup that is likely to be the real thing. Heretofore, in the apple syrups produced, there was an acid that rather spoiled the effect. By a chemical process, this acid has been removed and syrup made from apples is very likely, within another season, to become popular.

Pear growers who are members of the Oregon Growers Association received the highest prices this season ever known west of the Cascade mountains. On November 1 a car lot of Bose, grown at Medford, Oregon, topped the New York City market at \$7.38 a box. On November 2, part of another shipment of Bose pears was sold for \$7.09 a box.

WASHINGTON.

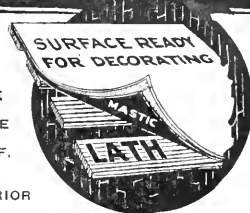
The annual meeting of the Washington State Horticultural Association and Northwest Fruitgrowers Conference will be held in Spokane, December 13 to 17. Other meetings that will be held at the same time will be those of the Washington State Grade and Pack Conference, the Northwest Potato Growers' Conference, the Washington State Beekeepers' Association and the Inland Empire Beekeepers' Association. An interesting program has been prepared for all these events and a general invitation is extended to fruit and potato growers and beekeepers throughout the Northwest to attend.

The Grays Harbor County Berry Growers' Association was recently organized at Satsop, Wash. A constitution and by-laws were adopted for the new organization and the following officers elected: J. W. Strubel, Elma, Wash., president; A. H. Fleming, also of Elma, secretary and treasurer. The plan is to hold meetings in the various towns in the county to secure additional members and to acquaint growers in all sections with the objects and activities of the association.

An apple crop of 13,420,000 bushels is estimated for Washington this year by the U. S. bureau of crop estimates. The 1919 crop aggregated 23,190,000 bushels. Cash buyers are few in number and growers are prejudiced against consigning. Large quantities of apples, therefore, are going into storage and there is a general expectation that market conditions will improve when the heavy volume of early fall shipments has been absorbed. Fortunately the country is better equipped for storage than ever before. The Washington pear crop is placed at 532,000 bushels, 71 per cent of normal.

Five hundred seventy-nine cars of Yakima apples rolled to market during the week ending November 13. These shipments bring the record for the season to 6,309 cars, as compared with the 1919 mark of 19,916 cars during the corresponding period. The value of

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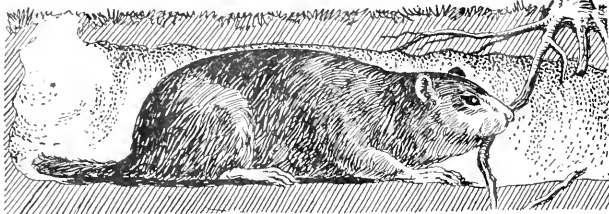


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this season's output is 89,000,000. One year ago by this time the growers had received over \$16,000,000. The total Yakima apple crop this season is estimated at 8,000 cars.

When orchardists meet in Spokane this month for the annual grade and pack conference it is stated that Yakima growers will fight to take Jonathans out of the "solid color" class and place them back into the "striped" class. Selah growers voted for a change and elected E. D. Collins, A. F. Guinan and P. W. Cornue as delegates. Selah growers declare that to leave Jonathans in the "solid color" class cuts down profits from that variety as only a few of the apples can be placed in the extra fancy grade.

Two new cold storage warehouses, with a capacity of 2,400 cars of apples, are assured for the Wenatchee Valley as a result of arrangements made by H. G. Bohike in New York. One warehouse and cold storage plant will be located in Wenatchee and another in Cashmere.

Apple shipments up to November 13 out of the Wenatchee district were 5,400 cars besides 1,017 cars of summer fruit. There is ample storage in the district for all the remaining apples, estimated at about 2,500 cars.

O. D. Webb, a Selah, Wash., fruit grower, writes Better Fruit as follows: "In the November issue of your paper I read a little piece about overbearing strawberries grown in Spokane county so I think it will be of interest to your readers to tell what I have done this year with 4,500 Americus strawberry plants that I set out on the 20th of last March. These plants only cover 100 square rods of ground. From this patch I sold 161 crates and 6 boxes which brought me \$677.55, and average of \$1.20 per crate. The first picking was on July 15 and the last on October 30."

IDAHO.

Over 50,000 boxes of apples are reported to have been harvested in the Stephens orchards near Nampa this year. Some of the leading varieties grown in this big orchard are the Delicious, Jonathan, Stayman, Grimes Golden and Rome Beauty. A study of the production of these varieties over a period of four years by Mr. Stephens shows that the Rome Beauty is the most productive. Mr. Stephens attributes this to the natural vigor of the Rome Beauty tree, its excellent root system and its habit of lengthened late bloom and also to his practice of feeding the land by cutting successive crops of grass and allowing it to lie on the ground. He states that his Rome Beauties have yielded for several years as high as 800 orchard run boxes per acre. In marketing his crop he finds that the Delicious leads in demand and value while the Stayman has proved the best variety for use in February and March.

Prof. E. R. Longley, of the University of Idaho, County Agricultural Agent P. T. Forner of Payette county, and County Agricultural Agent Guy D. Noel and John Moulton, county farm bureau committeeman of Washington county are cooperating in the study of the life history of the codlin moth in that section in order to compile data on the number of sprayings most desirable. The work will be carried on for at least another year before the conclusion of the investigators will be ready for publication.

With the object of carrying on a general fruit handling business the Valley Warehouse Association has been incorporated at Lewiston, Idaho. The incorporators are F. W. Baker, J. W. Wilkes, J. Florence and H. G. Darwin.

Plans are being completed by the Lewiston district to equip an exhibit train with a complete display of the fruit and other products of that section to be operated through the Middle West.

What They Are Doing in California

This year's raisin crop in California is estimated to be about 175,000 tons of which the California Associated Raisin Co. will handle about 150,000 tons.

A remarkable incident is related in regard to a Los Angeles county apple orchard by H. J. Ryan, county horticultural commissioner, who says that there is in that county a 35-year-old apple orchard sixty acres in extent that has never been sprayed and that has no codling

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November 1, 1920

SHENANDOAH, IOWA

moth or other insect pests. From the orchard this year 15,000 boxes of fancy grade apples were packed out. According to Mr. Ryan the owner of the orchard posted a notice in his packing house offering a dollar for each and every apple showing injury from codling moth turned in, but has not had to pay out a cent on this account.

Monterey county which has heretofore been almost exclusively devoted to agriculture and dairying is turning its attention to fruit. The climate of the county is stated to be well suited to all varieties of deciduous fruits and nuts and berries and it is stated that many orchard plantings are contemplated there next spring.

The additions that are being made to the plant of the California Almond Growers' Association at Sacramento will make it the largest institution of its kind in the world.

The University of California Fruit Show was held November 18th, 19th and 20th at Berkeley. The exhibit included many fresh fruits as well as a large variety of sun-dried and dehydrated fruits and vegetables.

In showing the benefits of a state inspection service for fruits and vegetables at shipping point the Weekly News Letter of the State Department of Agriculture of California publishes the following:

A car of Tokay grapes was shipped out of the Lodi district on September 18 to a concern in Louisiana at \$2.25 a lub box F. O. B. When the car arrived the shipper received the following wire:

"Tokays here show fully fifteen per cent decay and mold want thirty-five cents allowance answer quick."

The shipper replied that according to the state inspection report the car was in good shape when it left California and the receiver must accept at invoice. The buyer replied:

"Accept car Tokays without allowance mail certificate regarding condition when loaded we will file claim."

If the shipper had not had state inspection on this car he would have had to allow the buyer 35 cents per crate or about \$375.00 on the entire load. On this car alone, therefore, the growers saved enough money to pay for inspection charges on about seventy-five cars.

Bits About Fruit, Fruitmen and Fruit Growing

The announcement that the English maximum price control on apples which was to have gone into effect November 1 has been indefinitely postponed it is stated by apple exporters should be of great aid to apple growers of the Northwest whose exports from now on are expected to be heavy. J. S. Robinson, sales manager of the Earl Fruit Company, in commenting on the new situation, says that American apples should now command a higher price and exportations be increased. Mr. Robinson believes the postponement of the English regulation is a great encouragement to all fruit growers and that the apple business should pick up immediately.

Reports from all parts of the country show that National Apple Day and Week resulted in greatly stimulating consumption and in causing a further tone up in prices in the big markets of the East. In New York the campaign was carried on along educational lines as well as from a sales point of view. In the public schools 150,000 apples were distributed free and lectures on this history and economics of the fruit given. Joseph H. Steinhart, who is given credit for starting National Apple Week distributed 150,000 apples to the poor of the city, while from other sources 1,500,000 apples were given to the orphan asylums, hospitals and charitable institutions. Chain stores and wholesale merchants throughout the city took a wide interest in the celebration, as did also many of the theatres, which had streamers advertising the fruit and telling their patrons to eat apples.

If the recommendations of the American Railroad Association through James Menzies, freight traffic manager of the Atlantic Coast Line Railroad in regard to prohibiting the bulge pack on Florida fruits is extended to other sections of the country fruit shippers will be up against a serious proposition. The recommendation states that a great deal of loss occurred last season in handling citrus fruits because the bulge forced the tops of the boxes loose at the ends, splitting the fruit on the floor of the car. A strong protest has been made by the Florida Citrus Fruitgrowers Exchange against eliminating the bulge pack and the

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matter is now up for a reconsideration by the railroads entering Florida.

The tenth Indiana apple show was held at Indianapolis, November 15, with what is said to be the largest and best fruit exhibit ever held in the central West. There were displays from nearly every state in the middle region, and the leading orchard men were united in putting forth a great effort to bring a closer cooperation among the fruit growers of this section. The crowning feature which held the center of interest, and attracted the growers was the prize of \$200 offered for the best barrel of Stark's Delicious. A prize of \$250 was offered for the best box of this variety, and \$50 for the best plate. The exhibits of this brand were exceptional, and the competition for the prize money was very keen. In addition to the apple displays a full line of spraying machinery and materials, pruning tools, ladders and other orchard equipment were shown.

Cannery Notes

The formation of a five-million dollar corporation for the manufacture of machinery for canners and dried fruit packers is announced by the Berger and Carter Company interests of San Francisco. The new company will be

known as the Berger, Fleming and Brown Co., and will have its main offices and factories at San Jose.

The new corporation absorbs the following companies: B. & C. Machinery Co., Hayward, California, manufacturers of fruit and vegetable canning machinery; Smith Manufacturing Company, San Jose, California, manufacturers of machinery and equipment for packers of dried fruit; Wonder Dehydrator Company, San Francisco, California, manufacturers of "Wonder" Portable and Custom Dehydrators operating under the Hammond Process Patents; National Axle Corporation, San Jose, California, manufacturers of auto truck axles. The factory equipment of the B. & C. Machinery Co. will be moved to the plant of the Smith Manufacturing Company, while a new unit to be added to the National Axle Corporation plant will take care of the building of dehydrators.

The officers of the Berger, Fleming and Brown Co. are Otto A. Berger, chairman of the board of directors, W. W. Fleming, president and general manager, and E. W. Brown, vice-president and treasurer. Otto A. Berger is president and chairman of the board of directors of the Berger and Carter Company, San Francisco, W. W. Fleming, vice-president and secretary and E. W. Brown, treasurer.

Apple Scald—Its Cause and Prevention

Delivered Before the International Apple Shippers' Convention by Charles Brooks

WE HAVE been trying to find out more about apple scald, why it occurs and how it can be prevented. One of the things that makes the disease puzzling is that cause and effect are often so far removed that it is easy to overlook the connection. Scald makes its most rapid development just after the apples are brought out of storage and it would be natural to conclude that the shock resulting from the sudden change of temperature is responsible for the trouble. But instead of being traceable to any such near at hand condition the cause runs much further back in the life of the apple; back to the operation of the storage house, to the condition of transportation, to the methods used in the packing house, the kind of package, the time of picking and even to orchard and weather conditions.

These different factors are not equally responsible for the occurrence of scald yet any one of them or all of them may play a part in producing it. Where so many agencies are concerned it naturally raises the question of relative responsibility and when apples come out of storage with an unusual amount of scald next to the question of how to dispose of the fruit is that of why did it happen and who is to blame.

The time of picking and packing the fruit is one at which ownership and responsibility often shift and we may make this a dividing point in considering the different factors concerned in the production of apple scald. We will turn first to the orchard side of the problem and consider the scald determining factors inherent in the fruit when picked. The most important of these is the maturity and in fact the most generally recognized method of scald prevention in the past has been that of picking the fruit at proper maturity. Well matured apples scald less than green ones and highly colored fruit scalds less than poorly colored fruit. When the trees have been pruned so as to let in the sunlight and the apples left on the tree till well ma-

tured a great deal has been accomplished in the way of scald prevention. The remedy is a valuable one and should be used to the greatest extent possible yet we should not overlook the fact that at best it is very incomplete. Even in the irrigated sections where there is almost constant sunlight some of the apples will of necessity be poorly colored and in fact most of them have a green side or greener areas of some sort that serve as vulnerable points for scald. In the non-irrigated sections, comprising the larger part of the apple producing area of the country, the growers are far more at the mercy of weather conditions. There may be weeks of cloudy rainy weather in the fall that make it impossible to secure color and impractical to delay picking. Even in the most favorable seasons and with a reasonable degree of care a large part of the fruit must of necessity go into storage in a condition that makes it fairly susceptible to scald. The fact that the remedy is not complete does not, however, justify overlooking it and every possible effort should be made to have the fruit come from the tree in a well colored and well matured condition.

In this connection it perhaps should be mentioned that green apples do not scald more quickly than ripe ones. The fact that green apples scald worse than ripe ones has sometimes led to the in-

ference that they scald sooner but frequent examinations of fruit where the green and ripe apples are stored together will convince one that this is not true. The ripe apples that scald at all develop the disease before the green ones but if the fruit is held in storage until the green ones become scalded they are then far more seriously affected than the ripe ones.

Another orchard condition that has a bearing on the scald problem is the amount of irrigation or rainfall late in the season. Apples that are forced into rapid growth late in the year by excessive soil moisture are more sus-

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ceptible to scald than those receiving a more moderate water supply and also more susceptible than those that have made a more even growth throughout the season. In general large apples scald earlier and more seriously than small ones yet the question of size is closely tied up with the orchard conditions that produce the size and it is often the forcing the apples have received late in the season rather than the largeness of the fruit that is really responsible for the increased susceptibility to scald.

Another orchard condition that has an influence upon the susceptibility of the fruit to scald is the occurrence of disease. Apples that have been rusted by powdery mildew are more susceptible to scald than those that are free from it, but in general fruit from diseased trees is more resistant to scald than that from healthy ones. The most striking example of increased resistance to scald through the presence of an orchard disease is found in the case of cedar rust. York Imperial apples from trees that have suffered from a severe attack of cedar rust will remain free from scald four to eight weeks longer than apples from similar York Imperial trees that have been free from the disease.

The inherent susceptibility to scald that the apple carries with it at picking time is then an extremely variable characteristic dependent upon the various orchard conditions that prevailed throughout the season. A failure to give due consideration to the quality of fruit at this time might result in blaming the cold storage management for the spoilage of apples that really could hardly have been made to keep or possibly in some cases to giving him credit for keeping fruit that could hardly have been made to spoil.

But turning to the other side of the question and taking the fruit as it comes from the tree: What can still be done to extend the storage life of the scald susceptible varieties? In considering this phase of the subject it should be borne in mind that the apple as it goes into storage is still a living organism carrying on various complex life activities. It is continually giving off moisture and also odorous substances and it is carrying on a respiration similar to that of man—taking up oxygen and giving off carbon dioxide. These life processes can not and should not be stopped but the more slowly they can be made to act the longer the apple will live and the longer it will keep its good qualities. The most satisfactory and the almost universal method of slowing down plant activities is to lower the temperature and building on this principle we have developed in comparatively recent years our enormous system of refrigerator cars and cold storage plants. The apple has claimed its share of space in all this development and as a result the apple market and the apple season have been greatly extended and the quality of the fruit improved. But along with the development of our modern storage methods apple scald has come to the

front as one of our most serious apple diseases. The apple rots appear to have been with us always but apple scald is essentially a modern disease. This coincident development of the new disease and the modern storage has naturally led many to suspect some cause and effect relationship. Powell and Fulton of the U. S. Department of Agriculture investigated the question some 17 years ago and reported that they found no indication that cold storage temperatures favored the development of scald but rather that they retarded it. The cold storage companies have insisted that it was the delay in reaching storage rather than what happened in storage that was responsible for the trouble. But on the other hand it has often been found that apples stored in cellars or in air-cooled plants have come out of storage perhaps ripier but with far less scald than those held in commercial cold storage. We decided to go over the subject very carefully, covering a wide range of temperatures so that we might get not only the immediately practical side but also the principle of scald development. We carried on the work for three consecutive years and included practically all of the scald susceptible commercial varieties in our tests. The results were consistent throughout. Varieties like Grimes scalded one to four weeks earlier than York Imperial or Black Twig, but in general apples held at 60° or 70° scalded three or four weeks earlier than those at 50°; those at 50° four weeks earlier than those at 40°; those at 40° about three weeks earlier than those at 32°, and those at 36° also earlier than those at 32°. Between 60° and 32° each drop of 10 degrees meant a delay of three to four weeks in the time that scald would appear. The higher temperatures tested are, of course, out of the range of storage practices but they are not higher than those the apple is compelled to tolerate in delayed storage. We have found that a week to ten days delay in a warm packing house or in an unrefrigerated car results in two to three times as much scald on the delayed fruit as on that stored immediately at 32° and that the scald appears three to five weeks earlier on the delayed fruit.

The period immediately following the removal of the fruit from the tree is a time when refrigeration is most seriously needed and while 32° is the most desirable temperature it should not be overlooked that every degree of cooling is valuable.

One of the interesting things that developed in our temperature studies was the fact that at temperatures above 40° scald becomes evident as it is produced but that at 32° it does not. Apples held constantly at 32° may be badly scalded for months without showing any sign of the trouble but given a day or two in the warm air and they will go all to pieces. The abnormal diseased condition of the skin may develop at 32° but the temperature is too low for the death and spoilage processes to be completed. In the average commercial storage plant where the doors are open

almost every day the apples usually get enough gusts of warm air to develop evident traces of scald but in rooms that are little disturbed the potentially scalded apples show no sign of their actually diseased condition. This peculiarity of apple scald makes it a very deceptive disease and one that is capable of causing serious misunderstanding.



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Sonderegger's Prieztaker Onion is the largest and hardestest Yellow Globe onion. Reaches an immense size and commands a high price. Delicate flavor, and all other kinds of fruit trees. All kinds of bird seeds. Also dog food.

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Seeds and Trees That Grow

ings in the trade. Apples may appear to be in most excellent condition when removed from storage and loaded for shipment and yet if they should encounter a day or two of warm weather in transit, arrive at their destination in a practically worthless condition. Troubles like this are likely to be particu-

larly serious in after-storage shipments to southern markets.

With the prevailing cool weather in the more northern markets scalded apples can usually be disposed of before the disease has had time to become seriously evident. At least they can be passed along to the consumer and if he

eats them or cooks them at once everybody is satisfied. But if he holds them a few days for table use and finds that his good apples of today look like rotten ones tomorrow he is not left in a frame of mind to repeat his order or to do his part in apple consumption. The farther south the market the more serious is the difficulty of handling scalded apples. The larger amount of scald is not due to any shock resulting from bringing the fruit directly into warmer temperatures but merely to the fact that the higher temperatures allow the scald that is already present to become evident before the fruit can be sold.

Along with the temperature work the effects of ventilation and aeration were tested and the results were most surprising. We found that we could entirely prevent scald on any variety and at any temperature either high or low by giving the fruit fresh air. This threw a new light on the nature of the disease; it was apparently due to some condition in the air that was produced by the apples themselves. It also offered promise of a practical solution of the problem by means of ventilation. Our first tests were made in our own small refrigeration plant and for the past three years we have been carrying on aeration and ventilation experiments in various commercial storage plants. Under commercial conditions the great difficulty is to really secure an aeration that will reach the apples themselves. In the cold storage room everything is conducive to air stagnation. The rooms are stacked as full as possible and everything stands at practically one temperature. There is nothing in the general nature of things to start the air in motion and it seems practically impossible to do so with any efficiency by resorting to special equipment. Fans send a current down the aisles but the air back in the stacks is little disturbed. Where the rooms are cooled by the air circulation or bunker system there is a very slight breeze across the top of the room but it seems to have little effect upon the mass of the storage air. If windows are thrown open it is usually done when the temperature outside is practically the same as that inside and unless there is a strong wind prevailing in the proper direction the air in the storage room is but little affected. All of these things have been tested as to their effects upon scald and in spite of the very slight aeration secured all have been found to be of some value especially to the more exposed fruit.

(To be concluded in January number.)

Nitrate of soda applied to the soil at the rate of 5 pounds per prune tree, according to the Oregon Agricultural College, resulted in an increase of one-third the untreated crop in one Oregon orchard last year. Beneficial results both in the tree growth and fruitfulness were obtained in almost every trial in the Oakland sandy loam, the Lookingglass light hill soil and The Dalles reddish hill soil.

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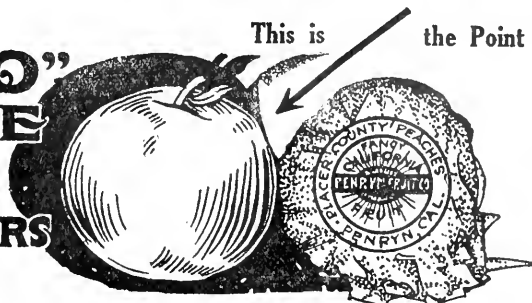
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SOON you will put the calendars of a new year up on your walls. You have weathered the labors of the past four seasons—with what benefits and damages you recall full well. Now the cycle of a new year looms ahead, and we must prepare to gather the fruits of 1921.

It is a time when conservative manufacturing enterprises and business houses are reviewing the past, taking stock of resources, and building future campaigns. Leaks are stopped, needs are reckoned with, and plans are made with extreme care.

Winter is the best time in most sections for complete farm inventory, for overhauling machines and making repairs, for accurate reckoning of profit and loss, for planning crop changes, for discarding old habits and considering new methods.

Every farmer knows this. It is good to see that there is more and more definite planning of full year's work at the close of every December, on the farms of America. It is so easy a matter to slide through the comparative resting period of Winter, and then Spring with its hundred duties bursts forth and finds many important matters and details unattended to.

We are glad to note this trend toward business-farming because we hope to be allied with Agriculture many more years and because our interests are so closely mingled with the interests of the farming world. So then, while we are setting our own house in order for 1921, we pause to publish the hope that you, the reader, may set forth into a new year of farming enterprise with all plans laid for a most profitable twelve-month.

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VOLUME XV

JANUARY, 1921

NUMBER 7

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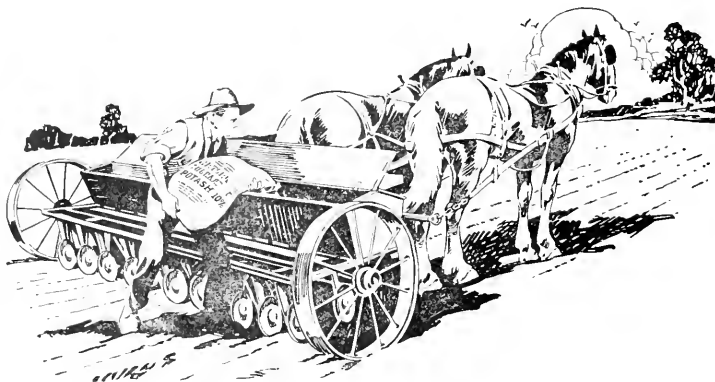
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In a way it was a return to the pioneer's method of mining the soil.

Today is the period of readjustment for the farmer as well as for the merchant and the manufacturer.

The farm labor situation and the uncertainty of future prices are such that prudence demands that the cost of producing a unit of crop be reduced as much as possible. This requires more crop units per acre and a return to the rotations known to be best for a given locality.

The great factor in reducing the cost of crop production is the right method of feeding the crops.

The composition of commercial plant foods has been profoundly changed during the period of Potash famine. Phosphoric Acid has replaced all or a part of the Potash in American fertilizer formulas, while just the opposite has taken place in Europe, where there was a shortage of phosphates.

Now is the time to get back to normal again and to return to the fertilizer formulas that were so profitable and satisfactory in the past. But this cannot be done without effort on the part of the farmer and without sufficient notice to the manufacturer to prepare for the change.

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NUMBER 7

Stock Influence on Scion—In Regard to Top Grafting

By A. E. Murneek, Assistant Professor of Horticultural Research, Oregon Experiment Station

THAT the two consorting parts of the graft, though remaining distinctly individual in their main characteristics, are reciprocally influenced by each other, has long been the subject of observation and study.

It is well known to most nurserymen that the scion or top of a grafted tree has a marked effect upon the stock or root system of the plant. This impression may be so profound and characteristic that varieties may be recognized by the root system formed, though the root be originally but a mongrel seedling. Unright growing varieties of apples of the Russian type, for instance, will form a correspondingly deep-growing root system, while those of the spreading Winesap type will be flat and shallow. This can be extended even to particular varieties. The Red Astrachan, Oldenburg, Fameuse, for example, form each a characteristic root system of their own. In this connection, Shaw believes that "the size or stoutness of the main branches is positively correlated with the size of the main roots and angle of the branch with the angle of the main roots and the axis of the tree. In many individual cases this correlation is obscure, yet careful observations with large numbers of trees will reveal it."

But it is not only the form of the root that is changed by the stock. The physiological modification brought about in the root may be effective enough to make it markedly different in hardiness and resistant to many external vicissitudes. To what degree of economic importance are these modifications can, however, only be conjectured.

The reverse of this, the influence of stock on scion, has been the subject of much more recorded opinions and observations than that of the scion on the stock.

English horticultural literature, especially the pages of the "Gardener's Chronicle," abound with plentiful and rich information on this topic. Though very scattered and more or less of a subjective nature, there is much material on this question recorded in the transactions of various state horticultural societies.

From the point of view of the fruit grower, the subject falls under two topics: First, the influence of the stock

on the scion proper, and, second, the indirect influence on the fruit.

Influence of Stock on the Tree.

The ways in which the scion may be modified by the stock may be in respect to—

1. Form and size of the plant.
2. Vigor of growth.
3. Health.
4. Hardiness.
5. Productivity; precocity.
6. Time of blossoming and maturing of fruit.

Some of these may not be directly traceable to the stock, but rather the secondary results of one or more of the above effects. Thus many of the modifications stated above may be due to increased vigor of the plant. Again, productivity is often directly dependent upon health and so is longevity. These in turn may be closely connected with hardiness.

That the stock has a marked and characteristic influence on the scion in respect to form and size of the tree is well illustrated in the common practice

of producing dwarfed trees by growing standard varieties on dwarf or dwarfing stocks. The apple on Doucin or Paradise stocks, the pear on the quince, the cherry on Mahaleb are but a few familiar examples.

1. The diminished size in most cases of dwarfing is due to a lack of supply of raw material to the scions, or a partial starvation. The cause of this may be attributed either to the particular character of the stock or, in some instances, to the imperfections and constriction of conducting vessels at the point of the graft union. In many instances, however, the scion partakes of the character of the stock to an extent which cannot be ascribed to the diminishing of food supply alone, but rather to some more specific and more profound effect brought about by a selective influence of the protoplasm.

2. As the stock has a tendency to impart its characteristics to the scion and as the commonly used stocks for top working are more vigorous than the scion, we can expect thus an increase in vigor of the top grafted tree. That many varieties of apples have been changed in vigor because of top grafting we have not only individual but also cumulative evidence, as will be seen below. In most instances vigor has been increased by top working, especially with such weak growing varieties like Grimes, Winesap and others. In an investigation of the adaptability of various stocks for the American grape, Hedrick reports that all top grafted vines are more vigorous than when grown on their own roots, ascribing this to the existence of a high degree of congeniality between the stocks and varieties under test.

The general cause of increase in vigor of top grafted trees may be due either to an increased supply of sap or raw material by the more active or faster growing stock, or due to some specific influence, which is of mutual benefit to both the stock and scion, and is often covered in a loose and general way by the term "congenial." That many varieties are made more vigorous when grafted on a particular stock (not necessarily of more vigorous growth) has long been an observed fact among practical horticulturists, though the reason of this effect is not known. Most ap-

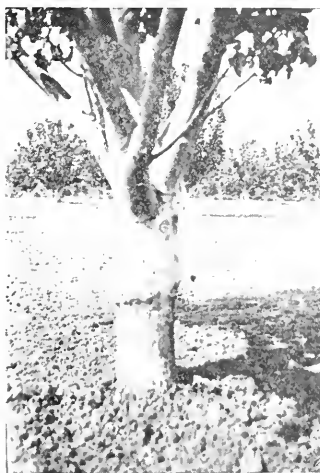


Fig. 1. Comice pears. Scions overgrowing stock. Such differences in growth must have some effect upon the performance of the tree.

parently there is a beneficial interchange of vital substances in at least the cases of certain congenial grafts, causing a stimulation and increase of activity of the scion. In this respect botanical relationship seems to play a lesser part than similarity of habitat of the two consorts.

A decreased vigor as a direct result of top grafting can just as easily take place, as was considered above.

3. An increased vigor may carry in its trail a number of benefits which are directly dependent upon vigor. The most important of these is most probably the general health of the tree. The comparative resistance of the stock and scion to parasites and injurious organisms, especially many fungus diseases, may make a variety more immune or resistant to certain diseases when top grafted on particular stocks. To what extent this is a direct acquirement or a secondary result due to a general increase in vigor is still an open question. A general improvement of the tree's health by top working because of a substitution of the roots, stem and even parts of the scaffold branches by a variety of known hardiness of immunity to particular troubles has been considered previously.

A desired stock may, however, transmit or impart a disease to the scion. This is said to take place, for instance, when stocks infected with peach yellows or little peach is budded with healthy buds; so also when blight infected stocks of the apple or pear are used.

4. In many sections of the upper Mississippi Valley the practice has become well established. Horticultural literature of the prairie states abounds with information on observations where hardiness has been increased by top grafting.

In almost all of these cases under hardiness has been meant the resistance of the variety to low temperatures.

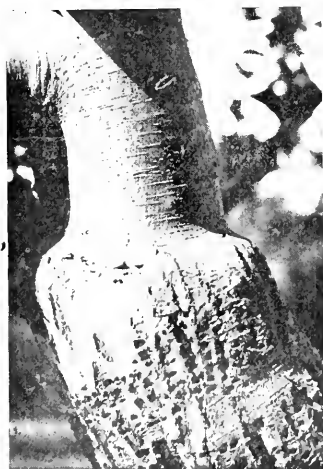


Fig. 2. A close view of union of stock and scion of a top-grafted tree.

The question as to the degree and amount the scion may be influenced by the stock is, however, not known. There is much information on hand, however, which shows most clearly that the top of a tree has been affected by the hardy stock; that trees have been saved from being killed by low temperatures because of the hardness of their roots. Of course, a very extreme frost, such as frequently occurs in the northern-most states and in Canada, will kill a tree in spite of the increased resistance to cold.

5. Top worked trees are commonly more productive and usually more precocious. A top worked tree will come into bearing two to four years earlier than when the variety is grown on its own roots. This is natural, because of the supply of an already well developed root system and frame work to the scion, which then makes a more rapid growth and reaches the bearing age much sooner. Not only early bearing, but also fruitfulness is increased by top working. Weak growing varieties will be made more fruitful because of the increased vigor as a result of the use of a more vigorous stock. Varieties that make a rapid and luxurious wood growth, especially during the first few years, will be made more productive when top worked on less vigorous stock or on one with which a more or less imperfect union is made. In both cases a diminished supply of sap from the stock will tend somewhat to weaken the top and make it more productive. This can be set down as a general rule not only in cases of top grafted apples, but also with those of most other fruits. After many years of experimenting with top grafting of grapes, Hedrick found that grafted grapes have larger yields than those on their own roots.

6. That the time of blossoming and maturing of fruit is often altered as a result of top grafting, has been frequently observed by fruit growers.

After much observation and experience with many varieties of apples, Budd of Iowa concluded that "there is much evidence that winter sorts of apples ripen prematurely when top grafted on Oldenburg or Whitney.

Again, the blossoming time of the scion is frequently affected by the stock. The differences in this respect have been noted to be from a few days to a week or more.

Hedrick reports of a case that has come to his observation, where a whole orchard of McIntosh top grafted on Oldenburg matured fruit two weeks earlier than McIntosh on standard stocks.

As in the case of maturing of the crop, so with time of blossoming, hastening or retarding in either case will depend mainly upon the difference in length of the growing season with different varieties used for stock.

7. In respect to longevity of top grafted trees, observation seems to be quite at variance as to whether top grafting in general increases the longevity of the tree. Hedrick believes

that it is almost a rule that weak growing varieties when grafted on vigorous stock will result in short lived trees. The use of a hardy variety for stock will in most cases insure a longer lived tree. This would be especially true if top working is done on the branches instead of the main trunk, for this would insure hardness and health to the most vital part of the tree. Varieties that are especially subject to various root troubles and to diseases of the crown, trunk or crotches would be insured a longer life.

In the case of many congenial varieties there seems to be a direct benefit derived from top grafting as a result of the differences of physiological changes in the stock and scion, which may act in a beneficial and stimulating way and thus increase the longevity of the top grafted tree. In what specific way this is brought about is still an unsolved question. The common information on this and many other influences of the stock on the scion are largely of an empirical nature. In order to learn what are the present opinions of experienced horticulturists regarding the beneficial influence exerted by the stock on the scion, the writer, while a staff member of the pomology section of the Iowa Agricultural Experiment Station, solicited in 1918 the opinions of a large number of the most prominent growers and nurserymen of the United States and Canada. It was asked in a questionnaire as to whether observations and experience have led to the belief that top grafting the apple on hardy and disease resistant stock has influenced the vigor, hardness, productivity, health and longevity of the tree. The following answers were received from a total of close to a thousand solicited:

Scion has been made	Yes	No
More hardy.....	55	12
More disease resistant.....	48	10
More vigorous.....	51	10
More productive.....	52	12
Longer lived.....	48	11
Total.....	251	55

From the above answers it is evident that while 82.2% of the total replies asserted that the scion has been benefitted in all of the above respects, only 17.8% are of the contrary opinion. This is especially true in respect to hardness and an increase in vigor and productivity of the top worked trees. This cumulative evidence is self-assertive and extensive enough to give additional emphasis to the benefits derived from top working.

Influence of the Stock on Fruit.

The indirect influence of the stock on the scion, expressed in changes of character of the fruit, may be in respect to—

1. Modification of color of the fruit.
2. Changes in size.
3. Changes in respect to eating and keeping qualities of the fruit.

As in many instances it is almost next to impossible to ascertain in what respect and to what extent the above

Continued on page 31.

Off-Year Apple Bearing

By R. H. Roberts, Wisconsin Experiment Station

BIENNIAL bearing of apples is so common in the eastern part of the United States that this condition is generally accepted as being a fixed tree habit. It is believed, however, in view of observations of fruiting conditions in typical orchards and of the results of experimental trials that off-year bearing is due to nutritional conditions and that it is consequently subject to modification. This present discussion deals with these observations. It is taken as significant that several varieties in a number of states which are ordinarily biennial in habit, were regular in bearing when proper growth conditions were secured.

Because of its economic importance any discussion of the off-year problem in the East should deal primarily with methods of relief. The interest of Pacific Coast growers doubtless lies more in the matter of prevention. Whatever the viewpoint, a review of the underlying principles, insofar as they have been developed, should be given as a basis for an appreciation of the suggestions as to control measures.

The present discussion is based upon information collected in the East. It is recognized that the amount of growth in the average eastern orchard is much below that of western ones. Data from experimental plots show that eastern trees have an average terminal growth of four to ten inches. What appear to be comparable experiments on the Pacific Coast, as at Hood River, show plot averages of nearly double this length.

This difference in growth conditions is offered as an explanation of the apparent differences in the tendency to irregular bearing in the two sections, rather than being an argument that the conditions are different and that the suggestions based upon eastern data have no bearing outside of the East. If a similar growth was obtained similar results would follow in both localities. When viewed from the standpoint of the relation of growth to fruitfulness, there is no apparent lack of application of the results secured. Observations made by the horticultural department of the Oregon Experiment Station show that the relations between growth conditions and blossom bud formation are very similar to those which have been found to prevail in the East. It is hoped that the observations may be extended to the orchards of the western coast soon, especially in view of the off-year tendencies of Newtown and Spitzenberg.

A popular theory regarding biennial bearing is that this condition is due to the over production of fruit. This is not necessarily true as many biennially bearing orchards produce light crops, even though they bear only every other year. The theory is not without foundation, however, as an off-year is quite sure to follow an extreme production of blossoms, which is usually accompanied by a heavy yield of fruit. This is because spurs do not regularly blossom

two years in succession even though no fruit was matured the first year. As a rule, if all the spurs blossom one season, they all miss the next. It is rare that an old bearing tree matures fruits on many more than one-half of its spurs during any one season. In such cases the fruits are generally small and of poor quality. A full crop can result with a third of the spurs blossoming. In fact there is an inverse ratio between the number of spurs blossoming and the number fruiting; the more there are that blossom the lower the percentage of fruits set. The result is that older trees produce their crop on a minority of the spurs even when all the spurs blossom. If fewer spurs blossom a higher percentage set fruit, and an equal or better crop of fruit may result. In practice, an ideal would be to have from a third to two-third blossoming each season.

Although thinning has been frequently advanced as a remedy for the off-year, it has given results in but few cases. The reason lies apparently in the fact that commercial thinning is done too late to affect blossom bud formation. Either the blossom buds are already formed for the next season or it is too late to modify the conditions determining their differentiation. Blossom buds can be distinguished from leaf buds as early as late June or early July. Removal of the blossoms before the fruits normally set in experimental tests has given successive blossoming. Early frost injury to the blossoms may likewise cause repeated blossoming of the same spurs.

Little more will be said of bearing although fruit production is the result desired. At present, interest centers about conditions of blossom bud formation, including spur habits as well as growth conditions of both the spurs and longer growths or branches.

Blossom bud formation is related to nutritional conditions. This seems to apply equally well to individual spurs or to trees as a whole. The principal measure used to show the relation of growth conditions to fruiting has been that of spur length. The part measured was the "previous season's growth," that is, the growth that was made when

the leaf or blossom bud was formed, not the current season's growth.

From the standpoint of fruitfulness the spurs may be classified as non-blossoming, blossoming and not fruiting, or blossoming and fruiting. The vegetative or non-blossoming spurs may be again separated into two classes, short and long spurs. Thus there are four classes of spurs. In the case of Wealthy these have average lengths as follows:

- Class 1. Vegetative (short spurs)— $\frac{1}{8}$ inch.
- Class 2. Blossoming (not fruiting)— $\frac{3}{16}$ inch.
- Class 3. Blossoming (fruiting spurs)— $\frac{1}{2}$ inch.
- Class 4. Vegetative (long spurs)— $\frac{3}{4}$ inch or over.

These relations of spur length to fruitfulness vary with the tree, variety, and season, but the main point is that such a relation clearly exists between growth (as measured by length) and fruitfulness. The medium length spurs are fruitful while the shorter and longer spurs are either unfruitful or less fruitful than the former. The fact of economic importance is that the fruitfulness of the older bearing trees appears to vary with the relative percentages of spurs of the different classes which are present.

The length of the spurs is of course not the cause of blossom buds forming but is only a correlated condition. Other characters such as the number of leaves on a spur, or better the leaf area of each spur, would show similar relationships. In fact the leaf area would probably show the closest correlations because of its function as a manufacturer of the type of foods which are known to be necessary in relative abundance before blossom buds are formed. At any rate, we can begin to appreciate more clearly that fruitfulness is a definite condition resulting from what appear to be rather definite conditions of nutrition and also that it seems possible to arrive at fair judgments of these conditions from external growth relationships.

An off-year is seen to be definitely related to the growth when we make a study of their fruit spur habits. An apple blossom bud produces two kinds of growth; the blossoms and a secondary wood growth which generally forms a vegetative bud, Fig. 1, A. This secondary growth seems to function much as a separate spur and in growth measurements made, it has been considered as such. That is, when measuring the blossom spur growth, from the standpoint of bud formation, only the secondary growth, from the cluster base out, was considered. With biennially bearing Wealthy trees it was found that in the on-year over 90 per cent of the secondary growths were less than one-eighth of an inch long or over 90 per cent of the growths were of class one. This very logically results in an off-year. During the off-year when no

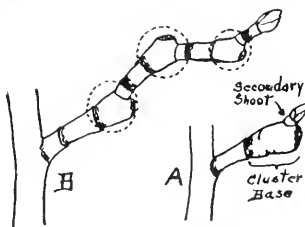


Figure 1. Fruit Spur Habits of Off-year Trees.
A. The growth during the blossoming season consists of a "cluster base" and a "secondary shoot." This latter does not regularly form a blossom bud.
B. In the off-year a vegetative growth is made which usually forms a blossom bud. This gives a biennial growth cycle of the individual spurs.

blossoms are produced, on the same trees, over 90 per cent of the growths were of classes two and three. In other words, these trees have a biennial growth cycle in which the spurs fluctuate from vegetative to fruitful. Fig. 1, B. The drain on the food reserve for the production of blossoms and the lack of a sufficient reserve seems to be the factor limiting the growth of the trees during the fruiting year.

Annually bearing trees of any given variety, like biennial ones, have growth conditions which would account for their regularity. In the first place they are generally very much more vegetative. Their average terminal growth is usually ten to fifteen inches in length as compared to four to six inches for off-year trees. Accompanying this greater terminal growth are some very important differences in blossom bud production, such as the occurrence of blossom buds on secondary growths and the formation of some terminal and lateral blossom buds. There are, however, two other main differences in the growth of biennially and annually bearing trees to account for their fruiting differences. (1) Many non-fruiting spurs during a fruiting year make enough growth to become class two or class three spurs (blossom forming) instead of remaining class one spurs (non-blossoming), as is the case with biennial trees. Thus some blossom buds are formed while the tree is fruiting. (2) What is probably the principal difference between the two types of trees is in the fruiting spurs on third year wood. Trees with short terminals develop few spurs on second year wood. Such as are produced are usually weak and do not form blossom buds unless spurs over the whole tree are forming them. With trees having terminal growths of a foot or more in length, on the other hand, there are several spurs on second year wood, some of these are usually of classes two and three and blossom buds are formed regardless of whether the older spurs are in or out of fruit.

Before discussing control factors it is well to restate that the spurs and growth lengths of which we have been speaking are not the cause of blossom bud formation. Internal compositions have been shown, as by Kraus and Kraybill,* to be related to external responses, one of which is fruitfulness. It is apparent, then, that any factor causing changes in the reserve foods of the plant could affect its fruiting. The value of any cultural practice in giving fruiting is an indirect one, acting through its having modified the internal composition of the trees. It is probable that less value should be placed upon any single treatment as fertilizing, cultivating or pruning, than has been the case formerly. Different treatments may have similar effects, thus pruning of a certain type could have the same effect upon fruitfulness as certain fertilizer applications, through a like effect upon the tree composition. There are, however, some rather definite ef-

fects from the different practices and it is in a few of these that we are especially interested.

Before deciding upon a cultural practice to remedy poor fruiting it should be recognized first that lack of fruit might come from either an over vegetative or an under vegetative condition and that it is in an intermediated one in which the greater fruitfulness occurs. After having classified the trees as to their condition, the character of remedy to be used can be foretold more accurately. The orchardist has rather definite signs by which to measure the vegetative state of the trees, as leaf sizes and color, length and diameter of spurs and branches, fruit sizes and colors and the occurrence and position of blossom buds.

Trees with long growths, dark green leaves and large, often poorly colored fruits generally have a high nitrogen or protein content and a low carbohydrate content. The latter substances are apparently used up in making new vegetative growth. The presence of nitrates seems to largely determine the vegetative condition of the trees. With an abundance of nitrates and moisture there is a large growth and a consequent lower carbohydrate content. This creates conditions which have been found to be unfavorable to blossom bud formation. Hence over vegetative trees are often unfruitful. Conversely, trees making little growth, having yellowish green leaves and producing small, unusually highly colored fruits generally have a low nitrogen content and a high carbohydrate content. The carbohydrates apparently accumulate because of little being used up in the production of growth. Such trees may be too low in vigor to produce blossom buds or, if they do develop them in abundance, they are too weak to produce much fruit. With this in mind and knowing that fruitfulness results from a condition of balance between the nitrogen and carbohydrate content we can proceed to a consideration of control measures with better chances of making suggestions of value than was possible formerly. In general, nitrogenous fertilizers such as nitrate or soda, proper cultivation and heavy pruning can be used to increase the vegetative growth of the trees. The opposite conditions, as sod culture and no pruning may reduce the growth to the point of poor fruiting.

Biennially bearing trees are typically low in vegetative growth. In their case the question is usually one of what means to employ to increase the growth. This leads to the question of the specific values of the different cultural practices in inducing a condition of greater vegetation. Unfortunately not much is known of these values at present. However, some generalizations based upon common experience and experimental results can be made with some assurance of keeping to fact.

Nitrogen is recognized as a most important fertilizer element in inducing an increased growth. Experimental trials show that the applications should be made early and in a readily available

form. Two factors have a bearing upon this result. One is the very low nitrogen content of most soils at the time of spur growth, even though they have a high available nitrogen content later in the season. The other is the very short period of spur elongation. In Wisconsin the shorter growths, which are typically the fruiting spurs, make their growth in length by the time the trees come to full blossom. Any success in increasing spur length and leaf area depends naturally then upon an application of fertilizer two or three weeks before the trees blossom. The result of the use of nitrogen fertilizers is to increase the growth, especially that of the terminals. From the off-year standpoint fertilizers could be used to maintain a terminal growth that would give blossom bud formation on the second year wood and fruiting in the third year.

Too little is known of the specific effects of cultivation in increasing tree vigor. It is a common experience that cultivation generally increases the growth. Whether this is due more to changes in moisture or in fertility conditions is not certain. At any rate the cultural treatment of any one season seems to have more effect upon the terminals than upon the spurs. This might be expected from the relation of cultivation to nitrate formation. Good cultivation greatly increases the amount of nitrates in the soil as compared to that in sod orchards. The important point is that the nitrogen content is not

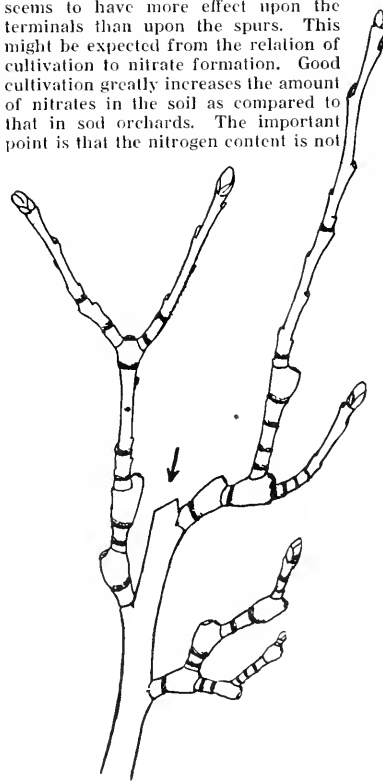


Figure 2. Effect of "Small Cut" Pruning Upon Spur Growth. Older run out spurs can be made more vegetative by making pruning cuts close to spurs. Thin out top with many small cuts instead of by removing a fewer number of larger limbs.

*Oregon Experiment Station Bulletin 149.

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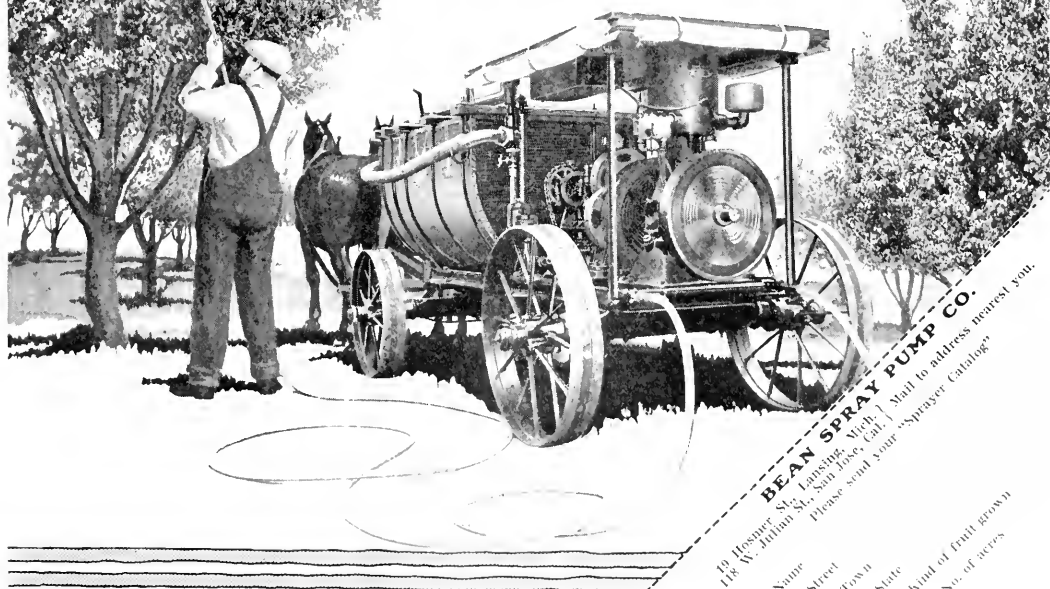


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high until late in the season after spur and spur leaf growth is over. As growth is in relation to the food reserve as well as to current seasons cultural conditions, any practice tending to change the nature of the reserve materials, could have an influence upon the growth responses. During a course of years, their cultivation could so alter the internal composition of the trees as to give marked differences in even the spur growth, when compared to that found in untilled orchards. Fruit trees need early season fertilization. Cultivation gives the greatest available nitrogen late in the season, after spur growth is mostly over.

Pruning has been found to play a most important part in inducing regular bearing of off-year trees. This is because of its value in rejuvenating the older spurs, Fig. 2. Irregular bear-

ing is common where there are many spurs of a low vegetation condition. Owing to the fact that the effects of pruning are largely local, small cuts near "run-out" spurs can be used to increase their vigor, give a variety of spur classes and tend to result in regular bearing. Also, cases of too much shade are subject to remedy by pruning. Pruning by the removal of large limbs should be avoided. Such cutting has a minimum influence upon the growth of older spurs along the remaining large branches. Thinning out of the tops should be secured by a larger number of smaller cuts being made close to the spurs which it is desired to rejuvenate.

Suggestions of how to secure annual bearing depend upon how near or how far the trees are from being regular now. This can be known only after ob-

serving the type of growth made by the trees, as to whether it is over, under or medium vegetative as compared to trees giving the best fruiting responses. "It is important when judging the trees, to know the amount of spurs blossoming but equally important facts to determine are: Are any blossom spurs forming on second-year terminal growths? How much growth are the non-blossoming spurs making? Are they making so little growth that no blossom buds are formed (while the tree is fruiting)? Are they making enough growth to be in the class of spurs that form blossom buds? The answer to these questions should be the basis upon which to build the cultural plans."

*Wisconsin Experiment Station Bulletin 317.

The Northwest Fruit Growers' Conference

WITH over 200 fruitgrowers in attendance, the annual meeting of the Washington State Horticultural Association, the Northwest Fruitgrowers' Conference and the Washington State Grade and Pack Conference opened at Spokane Monday, December 13, concluding on the 16th. W. S. Gilbert, president of the Chamber of Commerce, welcomed the fruitgrowers to the city while F. A. Wiggins, vice-president of the association, responded. President H. G. Boehlke of Wenatchee in opening the sessions of the horticultural association spoke briefly. His remarks were chiefly devoted to the cooperative movement in general among farm and orchard producers and the necessity for organizations of this kind.

The part of the program devoted to the control of insect and other plant pests and horticulture in general was then taken up and occupied much of the time of the convention. A leading topic in this connection was the injurious work of the leaf roller which was said by Leroy Childs, entomologist at the Hood River experiment station, to be causing serious damage over an area including California, Oregon, Washington, Idaho and Montana. Mr. Childs who has had considerable experience in fighting this pest advised poisons and contact sprays such as arsenate of lead and black leaf forty to destroy the young worms after they have hatched, and oil sprays to destroy the eggs.

In discussing the spray residue left on apples at times which caused considerable loss to a few Northwestern fruitgrowers last year by having their apples condemned in the East E. J. Newcomer of the U. S. Bureau of Plant Industry said that eliminating this eastern prejudice was a matter of education. He said that eastern consumers must be taught that in order to have fancy fruit it must be sprayed and that the small amount of spray sometimes left on the fruit was harmless.

Dr. A. L. Melander, entomologist of the Washington State College, in his remarks on pest control stated that the

work along this line was seriously hampered by lack of funds to carry on the work and A. B. Kelly urged that horticulturists bring strong pressure to bear to get larger appropriations for this and similar work.

Taking up the matter of the extension of the strawberry root weevil pest throughout the Northwest M. L. Dean, state horticulturist, discussed the advisability of establishing a statewide quarantine. The state agricultural department, he said, had this matter under consideration at the present time.

In the matter of interstate quarantine regulations W. H. Wicks, director of the Idaho State Bureau of Plant Industry, said that it was the sentiment of quarantine officials to modify to some extent the regulations now in effect and that a meeting of the Western Plant Quarantine Board was to be held soon to discuss the proposed modifications.

How to keep mice from girdling trees, which was an interesting subject, was handled by Theo. H. Scheffer. J. H. Stahl, of the Western Washington Experiment Station had for his subject small fruit growing, while R. T. Reid of Seattle discussed the grape in Washington. Better ventilation and more attention to maintaining a proper temperature for apples in storage and transportation was urged by R. R. Pailthorpe of the United States Bureau of Markets, while D. F. Fisher, pathologist of the United States Bureau of Plant Diseases, presented the results of investigations of apple scald. The various diseases of apples and their cause was the topic handled by Dr. F. D. Heald, pathologist of Washington State College, who went into his subject thoroughly and gave the growers much valuable information. Professor O. M. Morris of the state college gave an interesting informal talk on the effects of temperatures on fruit trees. Soil fertility was explained by Roy Larsen of Wenatchee, followed by E. D. Newsum who told of the importance of soil analysis. Other subjects presented were "Alfalfa a Soil Builder," E. S. Robertson, Extension Division, State College; "How to Prune

for Efficiency," W. P. Sawyer, Wapato; "Fruit Transportation Problems, Water versus Railway," J. Curtis Robinson, Seattle; "The Northwest's Opportunity" (an address on the benefits of cooperative growers' associations), C. I. Lewis, organization manager Oregon Growers Cooperative Association; "Cooperative Organization," Stanley Arndt, San Francisco; "Cooperative Marketing," Joseph Passonneau, Pullman, director of the State Bureau of Markets.

At a special evening session devoted to the subject of spraying, "The Effects of Dormant Oil Sprays," was presented by C. C. Vincent, professor of horticulture of the University of Idaho, while B. G. Pratt of the "Scalecide" company, New York, A. J. Gunderson of Cleveland, representing the Sherwin-Williams Company, and C. J. DeVise of the Rex Spray Company of Yakima, Wash., talked on the value and use of their respective sprays.

The joint meeting of the beekeepers and fruitgrowers resulted in a valuable interchange of ideas. George W. York, the veteran bee expert of Spokane, told of the value of bees to horticulture; Dr. A. L. Melander explained how bees pollinate blossoms, and J. J. Romage gave an enlightening talk on "Bees and Fruit as a Business."

Cooperative marketing was unanimously endorsed, the resolution saying in part "that it be resolved that the horticultural association of Washington recommends the earnest consideration and investigation of cooperative marketing to devise cooperative assembling and marketing associations suited to our conditions and products."

Stating that the fruit industry is bearing an inequitable burden in the matter of freight rates another resolution requests the appointment of a horticultural committee to work with the National Farm Bureau in taking up this question. The Truth in Fabric bill, the Capper-Volstead bill or a similar measure, the Vestal bill applying to standard containers, and the Kahn-Wadsworth or a similar bill authorizing the government to operate the nitrate plant at

Mussel Shoals were endorsed by a unanimous vote. An increase of 100 per cent in the appropriations of the Washington State Agricultural College experiment stations and extension service was also strongly recommended.

The officers elected for the coming year are: President, F. A. Wiggins, Toppenish; first vice-president, R. H. Kipp, Quincy; second vice-president, Dr. H. L. Geary, Underwood; secretary-treasurer, M. L. Dean; directors (three-year term), G. H. Bochike, Cashmere; J. Howard Wright, Yakima.

Notwithstanding the strong plea of the Yakima delegation to the Grade and Pack Conference that the three grade pack be abandoned and the two grade pack substituted the decision of the conference was to retain the three grade pack.

The social features during the conference including the annual horticultural dinner and the Ad Club luncheon were characterized by the usual Spokane vim, diversion, and sociability.

The general opinion of the gathering was that the outlook for the fruit industry in the Northwest is more than promising and that given a little time will adjust itself.

Intensive Fruit Culture Abroad

Intensive fruit culture to an extent scarcely to be found in this country was noticed at Cambridge, England, by Prof. L. C. Corbett, of the United States Department of Agriculture, who has just returned from a European mission. A concern there has an orchard of 1,400 acres, so densely set that machine cultivation or the introduction of a horse-drawn spraying machine is impossible. Apple trees are set 2 rods apart and are headed high, 6 or 7 feet from the ground, the spread of limb being more than 6 feet from the trunk. Between the apple rows, plum trees are set midway and also headed high; beneath the plum and apple trees, currant and gooseberry bushes are set in rows 3 feet apart.

Before the war culture was by hand, even to the spading. When the war took away man-power the owners saved themselves by introducing small "wheelbarrow tractors," manufactured in the United States, which have a tread of only 18 to 20 inches. The density of the orchard, of course, precludes horse-spraying. To meet this condition a complete waterworks system has been run through the roadways, which are placed at intervals, and lime-sulphur mixture or Bordeaux mixture is pumped through the mains from a central power plant, spraying 200 acres. The mixture is taken off by hose connected at intervals. The company owning this orchard has a large preserving plant for the manufacture of jam when the market is poor for plums and apples.

In Lombardy and Normandy, on the contrary, apple culture appears to be incidental to pasturage. The trees are set 50 or 60 feet apart and are pruned high so as to be out of the way of stock. Apples of Northern France are largely used for cider, in the manufacture and blending of which the people are as expert as in the manufacture of wine.

TOP-DRESSING TALK No. 2

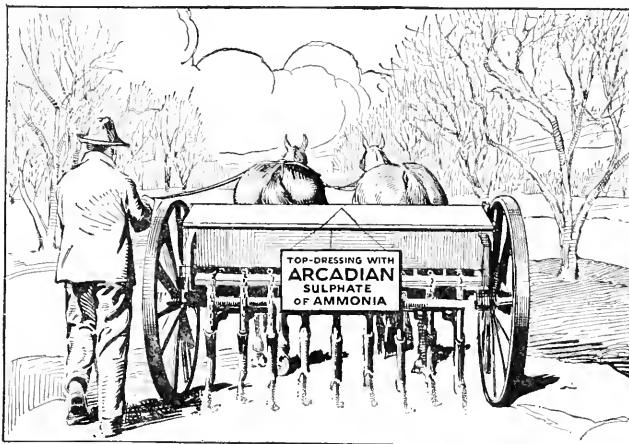
Off-Year Bearing of the Apple

"Observation of alternate bearing orchards for the past five seasons, however, leads to the suggestion that this habit is largely due to nutritional conditions.

"Off-year trees have been made to bear in succession by experimental means.

"The view has been presented that the use of an early season application of a quickly available nitrogenous fertilizer may be one means toward including regular bearing of off-year varieties of apples." (Wisconsin Bulletin No. 317—"Off-Year Apple Bearing.")

"Both the Yellow Newtown and the Spitzenberg seem to be alternate bearers, and even under some of our fertilizer experiments continue to be. On the other hand, in some of our experiments we were able to get three successive crops with both Spitzenburgs and Newtowns. It would appear reasonable to conclude that such a condition was due to the fact that all factors surrounding the tree contributed to such a condition, namely, that tillage, irrigation, pruning, etc., all contributed to this general result and harmonized with the fertilizer treatments." (Oregon Bulletin No. 166—"Fertilizers for Oregon Orchards.")



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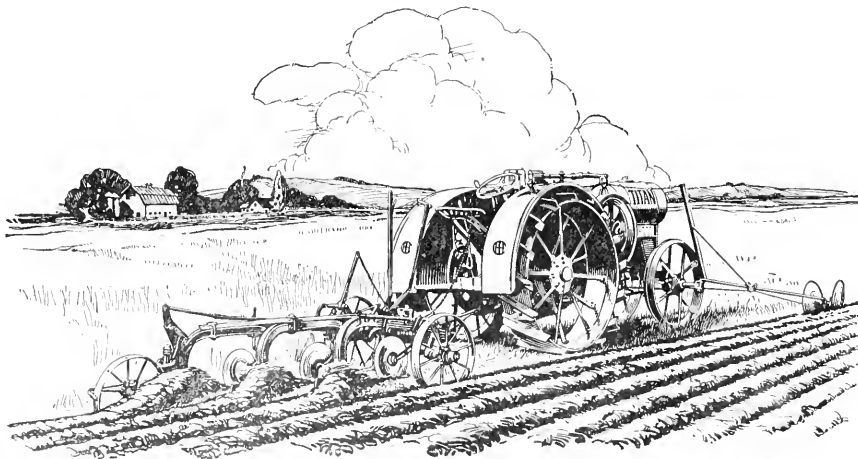
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Apple Scald—Its Cause and Prevention

Delivered before the International Apple Shippers' Convention by Charles Brooks

(Continued from December Number)

ANOTHER condition that makes it difficult to solve the scald problem by means of storage ventilation is the fact that it does not suit to ventilate at the time the apples need it most; that is during the first weeks of storage. The outside air is likely to be warm at the time the plant is running at full capacity to bring down the temperature of the incoming fruit and the managing force fully occupied with other duties. Some storage plants that make a point of throwing their windows and doors open do not begin this ventilation till the last of December or first of January. This is too late to be of any benefit to the early scalding varieties as the time for the remedy is passed several weeks before the scald actually appears. Grimes apples do not usually become scalded until after they have been in storage 12 to 14 weeks. A single really thorough changing of the air around the apples themselves at the end of 6 or 7 weeks will delay the time of scald appearance more than a month but an equally good ventilation at the end of 8 or 9 weeks will have little or no effect upon the time that scald will appear. The abnormal conditions have then prevailed too long; the stage is already set for the scald that will become evident several weeks later and remedies are of no avail.

Some apple communities have adopted a method of delayed packing that is of considerable value in scald prevention. The apples are stored in open picking crates just as they come from the tree and are later transferred to a special packing room, run over a grader furnished by the storage organization and packed in boxes and barrels ready for the market. The open crates secure quicker cooling and better aeration while in the storage room and the thorough airing given in sorting and packing sends the fruit back into storage sufficiently freed from harmful gases to add several weeks to the storage life of the scald susceptible varieties.

One of the things that plays a very important part in determining the effects of any storage ventilation is the manner in which the barrels or boxes are stacked in the room. Some storage houses stack their boxes solid but most of them use strips between the layers and leave space between the stacks. A large number of storage houses leave an open space around the walls and some of them, particularly those in the West, hold the fruit 2, 4 or even 6 inches from the floor by means of scantling or some form of false floor. All of these things that tend to give openness to the stack are valuable for both refrigeration and ventilation and all are of value in scald control. We have not found, nor been able to develop any commercial storage condition that will completely handle the scald problem. The apples in the middle of the stacks do not get the fresh air and are but little benefitted by storage ventilation. In a test made

in a storage room that was opened frequently it was found that the apples in the center of the stack became scalded four weeks earlier and finally developed about three times as much scald as those near the doors.

Air-cooled storage houses often secure as good or better results in scald prevention as the commercial plants, the bad effects of the higher temperatures being offset so far as scald is concerned by the good effects of the ventilation. An air-cooled plant that maintains a fall temperature of 10° to 15° may be able to bring its apples through fairly free from scald; but if a commercial storage plant with its tightly closed rooms should be compelled to allow its temperature to remain at such a high point for a few weeks in the fall because of a shortage of refrigeration or a poor distribution of the warm fruit the condition would result in a great increase in scald later in the storage season.

One of the most important places for ventilation is the packing house. Fortunately most packing houses are really sheds and cannot be closed. The free circulation of the night air is particularly important both on account of its coolness and the ventilation secured. Large closely stacked piles of fruit in the packing shed may produce distinctly harmful effects, especially if the top and front of the pile is continually passed along to storage and the bottom left undisturbed for a number of days.

The character of the packing plays a very important part in ventilation and is therefore a determining factor in scald occurrence. Apples scald far less in boxes, hampers and ventilated barrels than they do in the usual commercial barrels. This is especially true where the storage room receives at

least a small amount of ventilation. We have had particularly good success with the ventilated barrels. In most of our storage experiments these were prepared by cutting 15 holes or slits (each $\frac{3}{4}$ inch by 4 inches) in the staves of the ordinary apple barrel. Reducing the total area of the holes by one-half gave much poorer results. Apples packed in the above ventilated barrels have usually had the scald reduced to one-half or one-third the amount on similar apples in the usual commercial barrels and the disease has appeared on the fruit three to four weeks later. The ventilated barrel shows up to the best advantage in cases of delayed storage. Apples in ventilated barrels delayed a week to ten days in an open packing house will usually show less scald than those in tight barrels that are stored immediately. If the apples are fairly green at picking time a few days delay in ventilated barrels may actually improve the keeping quality of the fruit at least so far as scald is concerned.

While we were trying to find out what uses could be made of ventilation in scald prevention we were also making experiments to determine what the harmful substances were that needed to be removed from the apple for if we could only find this out we might be able to absorb them in the package or in the storage room and obviate the necessity of renewing the air. Conversations with cold storage men revealed the fact that many of them were of the opinion that high humidity in the storage room was favorable to scald. Experiments were therefore made to test this theory, apples being stored in atmosphere having various percentages of moisture. With 50 per cent relative humidity the apples withered badly yet they scalded if the air was not stirred. With 70 per cent relative humidity some varieties withered and all scalded if the air was stagnant. The scald was

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little worse with 80, 90 and 95 per cent relative humidity than with 50 per cent. On the other hand if the air was kept in gentle motion scald did not occur even with the highest humidities. Some indication was found that moistures deposited in drops on the apple might favor the development of a sort of spotted scald but on the whole the experiments showed that humidity played little if any part in the production of scald as it occurs in commercial storage.

Defeated in our purpose of proving the humidity guilty, we felt sure that the trouble must be due to abnormal respiration conditions, either that the oxygen of the air boxes became too greatly reduced or the carbon dioxide accumulated to a harmful extent. Experiments were made in holding apples in atmosphere having various percentages of oxygen, the normal amount, an excess and a deficiency, but they scalded alike under all the conditions. Tests were made with carbon dioxide, the apples being stored in atmospheres having various percentages of the gas, some of them much higher than ever occur in commercial storage; but we found that carbon dioxide really tended to delay rather than hasten the development of scald. We were especially disappointed with the outcome of the tests on carbon dioxide for we knew that the gas sometimes becomes quite strong in storage rooms and we felt sure it would be found an important factor in scald production.

We did, however, obtain one important result in connection with the experiments on carbon dioxide and moisture. While the results showed that these substances were not responsible for the occurrence of scald they proved that they were the cause of what is known as soft scald. Soft scald occurs largely on Jonathan and Rome Beauty apples and occasionally on Spitzenberg and Stayman Winesap. It produces blister like areas on the skin that extend over the surface, in various peculiar patterns. The red surfaces are attacked as much as the green ones and there is a clear cut margin between the sound and diseased tissue. It bears some resemblance to frost injury and damages have sometimes been paid on it under that name. The cause of the disease, however, is not too low a temperature but an excessive accumulation of carbon dioxide and moisture usually at a high temperature and especially in cases of delayed storage. In all the cases of soft scald of which we have been able to obtain the records, the fruit had been delayed at a fairly high temperature before going into storage.

To return to the apple scald question we found ourselves near the end of the third year of our storage experiments with little but negative evidence as to the substance that was really causing the scald. We had made no experiments on the odor producing and related substances given off by the apple. We didn't know what they were nor what would absorb them and really didn't think they could be of importance. But following up the gas mask

idea we stored apples in various kinds of charcoal and sawdust and in almost everything we could think of that had some gas absorbing power. We knew that butter absorbed odors and that fats and oils were used in extracting perfumery so we made a thorough test with wrappers impregnated with various waxes, fats and oils. Most of the things tested were a failure, the wax and paraffin wrappers were of little value but those with either a fat or an oil were a complete success. We have used the oiled wrappers now for three years, have tried them on practically every scald susceptible variety and tested them under the most severe and unfavorable storage conditions and with the exception of one test they have always given 100 per cent control of scald. The exception was with a very green lot of Black Twigs and in this case the disease was delayed about a month and was reduced from 65 per cent on the unwrapped to 15 per cent on the oil-wrapped fruit. We have tested almost all kinds of vegetable, animal and mineral oils and while most of them will control the scald the highly refined paraffin oils seem to be the most satisfactory. They are among the cheapest oils, they do not become rancid, and they are already extensively used on paper and otherwise in connection with food products.

The oiled wrapper is by far the most efficient remedy we have found for scald. It also has an advantage over other devices for scald prevention in the fact that it is always with the fruit furnishing protection on the way to storage, while in storage and in after storage shipments.

One difficulty with the oiled wrapper is that it is not adapted for use with barreled apples and these need protection from scald more than any others. We have tried to find some other means

than the wrapper of carrying the oil with the apple. We have experimented with oiled barrels and with scraps and strips of oiled blotter scattered through the barrel, but the oil does not come in close enough contact with the bulk of the fruit to give anything like complete scald control. We have tried spraying the oil on the fruit as it goes over the packing table. This prevented scald but produced a scald-like injury where the oil remained in drops on the skin. Wiping the apples with an oiled rag has so far given complete scald control without injury but we have tried this only one season and on but a few varieties of apples. The method will be given a very thorough test the coming year. If it should prove an entire success there are already fruit wiping grader attachments on the market that could probably be utilized for applying the oil mechanically.

It may take several years of general commercial use to determine the most satisfactory manner of handling the scald problem but the disease is a preventable one and we have several methods of attack. Whatever is done, whether in the way of oiled apples, oiled wrappers, ventilated barrels, or ventilated cars, packing houses and storage rooms would have the same object; that of removing from the apples the harmful gases of their own production.

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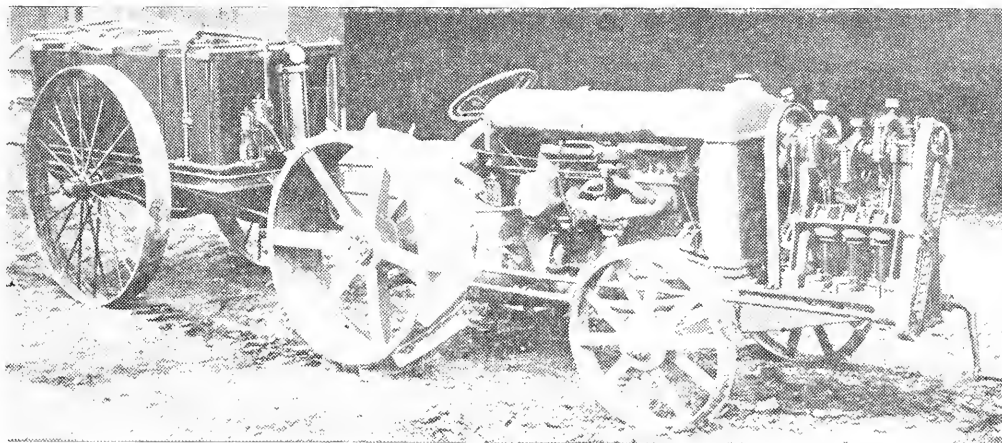
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Results of Studies in Prune Pollination

WITH a view to determining the failure of prunes to set fruit in some years while bearing abundantly in others the Division of Pomology of the University of California has been carrying on experiments for several years. Among the varieties being studied are the French which is grown quite extensively in the Northwest as well as California where the acreage of this variety is very large. In fact in the Santa Clara Valley alone it is stated that there are over 61,000 acres planted to prunes largely of the French variety with a few scattered plantings of Imperial and Sugar.

While the study made was largely confined to pollination, A. H. Hendrickson, who has issued a bulletin on the subject, says that the lack of fruitfulness generally did not point altogether to lack of proper pollination. In noting the results of his experiments Mr. Hendrickson says:

"While the Imperial, Robe de Sergeant and Silver prunes have long been considered shy bearers, the French and Sugar have continued to bear more or less satisfactorily when set out in large blocks of a single variety. Many growers in the Santa Clara Valley have noticed an appreciable falling off in their crops, and have been anxious for information relative to the cause. Improper pollination, due to self-sterility, was believed to be at least one important factor causing this imperfect set. Another factor has already been shown to be responsible to a degree for this failure to set commercial crops. This factor is the lack of honey bees in the orchards at blooming time. Proper pollination has been shown to be dependent upon insect agencies to carry the pollen. It is probable that other factors such as

pruning, cultivation, fertilization and irrigation will be shown to influence the amount of fruit set."

As a result of the experiments Mr. Hendrickson notes: "The three varieties of prunes, French, Sugar and Robe de Sergeant experimented upon at the university farm have set comparatively high percentages of fruit and matured fairly satisfactory crops considering the age of the trees. The French and Robe de Sergeant yielded consistently each year, but the Sugars failed to blossom in 1916. As this failure followed a heavy crop it was thought that the drain upon the tree had been so great that it was unable to mature fruit buds for the following season. This variety again in 1918 behaved in the same manner, failing to produce any blossoms. This seeming tendency towards alternate bearing is an uncommon occurrence with this variety. The general reports concerning it are that it bears heavily and regularly. However, from four years' data at the university farm at Davis, it would seem that if young trees just coming into profitable bearing are allowed to overbear one year, only a light crop is produced the following season. One of the most serious criticisms of the Sugar prune is that it tends to overbear.

"The French and Robe de Sergeant at Davis, on the basis of regularity in bearing, have proved to be more valuable than the Sugar. The former variety during the three years of 1915, 1916 and 1917 produced an average crop of 57.5, 41.7, and 145 pounds, respectively, or an average of 81.4 pounds per year for the three years. This crop resulted from an average set of 28.7 per cent. The Robe de Sergeant practically equalled the record of the French. In

three years the average crop per tree was 95.1, 79.6, and 100.6 pounds, or a total average per tree of 91.4 pounds from an average set of 28.7 per cent. Roughly speaking, the above yields approximate three tons of green fruit per acre, which is a fairly satisfactory commercial yield considering the age of the trees (eight years in 1915). In the case of the Sugar prune the average yield is only available for two years, as no crop at all was produced in 1916. These yields were 30.1 and 147.3 pounds per tree, or an average of 88.7 pounds per tree for the two years, resulting from the high average percentage of set of 41.6 per cent. If this yield is calculated on the basis of three years, as might properly be done, the average yield for the variety is thus reduced to but 59.1 pounds per tree.

"Two varieties of these prunes, the French and Sugar, are self-fertile, while the third, Robe de Sergeant, is self-sterile. Four years' results with self-pollinating the French prunes have shown great fluctuation in the percentage of fruit obtained. Some years this percentage was high and in others it was low, but the average for four years shows that this variety must be accepted as self-fertile. Upon what factors this self-fertility depends is not known but it seems to be largely a matter of applying the pollen at exactly the right time. Climatic conditions following the application of pollen may also exert some influence on the resultant set. This conclusion as to the self-fertility of the French prune, which is emphasized by the Santa Clara experiments, is of utmost importance to the prune growers of California. It shows why vast acreages of this variety have been able to produce crops year after year without the necessity of growing fillers as pollenizers. The next problem is to find what environmental conditions

favor the highest percentage of set when the blossoms are pollinated with their own pollen, as must necessarily be the case in most of our prune-growing sections.

"The Sugar prune which is supposed to be a seedling of the French showed an average set of 8.1 per cent from self-pollinated flowers. This evidence was corroborated by data obtained in the Santa Clara Valley (four-year average, 8.1 per cent) and shows there is no need of interplanting other varieties with the Sugar for purposes of cross-pollination. The Robe de Sergeant has emphatically and consistently proved to be self-sterile and in urgent need of cross-pollination to secure crops. These data support the widespread contention among growers that unless it is properly interplanted with other varieties, the Robe de Sergeant is a shy bearer.

"In spite of their reputed relationship no trouble was experienced during the four years in obtaining satisfactory sets when French was crossed with Sugar or vice versa. The French prune was found to be readily cross-pollinated by either the Sugar or Robe de Sergeant. Although the average result of these

hand-made crosses was not as high as the set under open orchard conditions, they were higher than the average set resulting from the self-pollinations. Thus it was shown that, even though self-fertile, the French prune might still be benefited by pollen other than its own. The French prune has the additional good quality of being a heavy pollen producer and an excellent pollinizer for the other varieties of prunes. The French as a pollinizer for the Robe de Sergeant gave an average of 10.5 per cent set for the five-year period. The one year's results as a pollinizer for the Sugar cannot be considered infallible as results in the Santa Clara Valley have proved the French an efficient pollinizer for the Sugar.

"No eminently noticeable results were obtained at Davis when Sugar was used as the female parent. As a pollinizer for both the French and Robe de Sergeant, the Sugar has no equal. It produces an abundance of pollen, blossoms at practically the same time, and has proved effective in four years' trials. The high percentage (10.6 per cent) when used on French, and the still higher percentage (13.2 per cent) when

used on Robe de Sergeant, amply attest its value.

"While Robe de Sergeant was proved to be self-sterile, it was also shown to be readily capable of fertilization by any other European plum blossoming at the same time. French and Sugar as pollinizers for four years gave the best average results, but Tragedy, Pond, and Imperial Gage, tried for a lesser number of seasons also show possibilities as pollinizers for this variety. It is perhaps important to note that the prunes commonly grown with the Robe de Sergeant are so efficient as pollinizers that the other varieties mentioned (Tragedy, Pond, and Imperial Gage), are rarely found planted with it. As a pollinizer it has proved effective on the French, but because of an improperly timed operation in the one year it was tried, it was not so successful on the Sugar. In view of the foregoing it would certainly seem advisable to interplant Robe de Sergeant prunes with either the French or Sugar varieties.

"The most interesting fact noticed in studying the set of the fruit under open orchard conditions in two Santa Clara Valley orchards was the small percentage of blossoms which matured fruit. Yet it is with these low percentages of set that the commercial crop of prunes of California is produced. In the Pettit orchard at Cupertino this set has been remarkably uniform and has yielded each year what the owner considers to be a fair crop. In the Sorosis orchard at Saratoga the set was fairly uniform for 1915 and 1916, but in 1917 the owner placed some 115 colonies of bees in the orchard during the blossoming season. Because of the bees the percentage of set increased greatly in 1917 and raised the average for the three-year period up to 8.3 per cent. Moreover, the yield emphasizes the effective work of the bees. In 1916 with the normal set averaging 3.2 per cent the yield on 180 acres was 344 tons of dried prunes. On the same acreage in 1917 with an average set of approximately 12.9 per cent the yield was 432, or an increase of nearly 100 tons of dried fruit."



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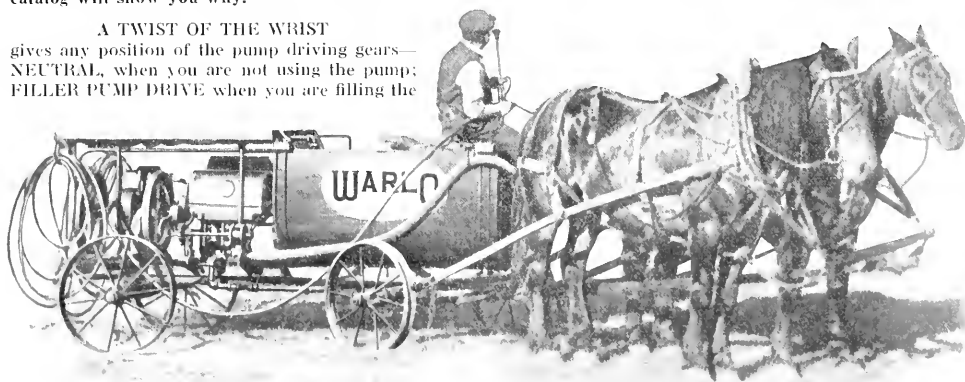
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Water Transportation.

The recent shipment of apples from Portland, Oregon, to New York at the hands of the United American Lines, a strongly organized steamship company recently formed for intercoastal service, is likely to be the opening wedge of a waterway movement of a large tonnage of fruit from the Pacific Northwest to Atlantic Coast points and Europe.

The importance of this move and the putting on of fast steamers that will sail from San Francisco and other Pacific Coast ports equipped with refrigeration that will make a specialty of carrying fruits from this region to the Orient are fraught with great possibilities to the fruitgrowers of the Pacific Northwest.

In writing of the great importance of developing water transportation for Pacific Coast fruits, Charles A. Malboeuf, who has had a wide experience in handling apples both in this country and abroad, says:

"Years like 1912, 1914 and 1920, similar as they are in many respects, point to certain definite conclusions. Foremost is the recognized vital need for a vastly greater market than now offered within our shores and those of the few export countries we are shipping to today, or have shipped to in the past. Call that specific need water transportation, and you express precisely what I have in mind, because in water transportation is embraced a host of potential benefits.

"In seasons of this kind, where the national apple crops are fairly or abnormally large, and subnormal economic conditions of varying acuteness prevail, the marketing of our apples becomes a serious problem. The crops, in whatever volume they may be, seem in excess of the market requirements, or at least beyond our ability to distribute at profitable prices. The general conclusion, under those circumstances, is that we must have more markets, specifically a greater export market. That expresses the situation broadly, but few persons realize the extent to which that export market must exist, especially the tremendous character of water transportation essential to properly meet actual needs."

Recent investigations are to the effect that large quantities of deciduous fruits can be disposed of in the markets of the Orient as well as Europe. All that is lacking for the Oriental trade apparently is transportation and this according

to recent announcements will be provided. The outlook therefore for additional markets through water transportation to markets both far and near seems bright enough to warrant the Pacific Coast fruitgrower in regarding it as one of his greatest possible assets.

Poultry in the Orchard.

Every fruitgrower should find it profitable to keep poultry, the number depending largely on the size of his ranch. Where the acreage is large and a diversity of crops are grown it is possible to maintain a larger flock than on a smaller place. It is found that where chickens are kept in connection with an orchard and are allowed to range that it is not necessary to buy much feed for them except during the few winter months. In fact the orchard provides a variety of foods such as insects, seeds, green matter and grit highly relished by chickens. The practice by most orchardists of planting a cover crop in the late summer or early fall and turning it under in the spring affords fine pasturage for poultry during the time

IMPORTANT NOTICE TO SUBSCRIBERS

Effective January 1st, 1921, the subscription price of "Better Fruit" will be \$1.00 a year, and subscribers who have renewed recently at the old rate of \$2.00 a year will be extended in accordance with postal regulations.

they are not confined. The eggs and fowls that can be taken to market from time to time add considerably to the family income in the way of living or in purchasing little things needed for the home.

In raising fowls it will pay the fruitgrower best to choose one breed, preferably of an all purpose strain, that is the kind of strain that are both good layers and good table fowls, as his marketing opportunities are doubled. Also if he is raising a pure-bred flock of chickens he will find it much more profitable in disposing of the chicks should he raise a surplus or go into the breeding business. With a well built poultry house and not too large a flock the orchardist who gives his poultry the right attention will find the venture profitable.

For these reasons BETTER FRUIT is opening a poultry department that it hopes will prove both valuable and interesting to its many readers.

A Tariff for Fruits.

From recent disclosures made by W. H. Paulhamus, head of the Puyallup & Sumner Fruitgrowers' Canning Company, in regard to foreign competition with some of our small fruits, notably cherries, and also through investigations along this line from other sources it is apparent that a tariff would prove beneficial in protecting American fruits and nuts from the competition of those grown under cheap labor con-

ditions and exported to this country and sold at a lower figure than the home-grown product.

The matter of a tariff to protect home-grown fruits has already been taken up tentatively by a number of fruitgrowers' organizations on the Pacific Coast and Congress will no doubt soon be asked to frame a law for this purpose. As the development of several branches of the fruit industry and its future prosperity will largely hinge on controlling or at least fixing the price for these foreign fruit products that will place them on a level with the home-grown article it is of great importance that such a measure receive the support of fruitgrowers and Congress as well.

Caring for a Patriarch.

The action taken by the Washington State Horticultural Association at its recent meeting in Spokane to provide care and protection for historical apple trees is of interest to every fruitgrower in the Northwest and is to be commended. The particular tree which the members of the Washington society had in mind when it adopted the resolution providing for this action is one that was planted at Vancouver, Wash., in 1826, according to historical tradition. The report of the committee which was assigned to care for the tree is that it is apparently healthy and in good condition although lacking but five years of being 100 years old.

Arrangements have been made to have this patriarch of appledom lack for nothing during its declining years, a fitting tribute to its historical interest as the oldest living representative of an industry that has now become one of the most prominent and successful in the state of Washington and other sections of the Northwest.

What the Papers Intend in Fruit Are Saying

THE PLOWMAN.

The plowman used to plod his way.
The old style plowman is today
Not such a factor.
For we have been progressing some;
The modern plowman rattles home
Upon a tractor.—Tractor Farming.

It cost the state hospital at Oshkosh \$128.40 to spray their 800-tree orchard under the direction of E. R. Gifford of the horticultural department at the Wisconsin College of Agriculture. When they figured their returns at the close of the apple harvest they found a return of 4,666 per cent on their spraying investment. Here is their story: Four sprays were applied at the right time. It took 800 gallons of spray mixture and the work of 3 men, and a team for 12 hours to apply each spray. It cost slightly more than 16 cents to spray a tree four times, their cost figures show. When they picked their apples they found that on an average sprayed tree they had eight bushels of apples worth \$1.25 a bushel, or \$10. But one-half bushel were unmarketable. On an unsprayed tree they got one-half bushel of marketable apples, and 1½ bushels of unmarketable fruit. They figured these apples as worth \$2.50. A spraying cost of slightly over 16 cents a tree made a difference of \$7.50 on the value of apples.—Wisconsin University Bulletin.

With apple prices gradually slumping, even best grades, winter varieties, a good deal of interest centers around the investigations just completed under the direction of the New York State Federation of County Farm Bureau Associations on cost of producing a barrel of apples under average conditions in Western New York

orchards. It is patent that the day has gone by when \$2.50 a barrel yields a handsome revenue to the grower, just as the day of 25c apple barrels has past. The local county farm bureaus assisted in collecting the data from among the best growers of the territory. Incidental to the work of collecting the data, a poll was taken of 260 growers in the district on what price should be received for Baldwin, "A" grade, to show the grower a fair profit on work and investment. Ninety-seven per cent of the estimates are \$5 a barrel or over with the average \$6.62.—*The Packer*.

The drift of population from the farms to the cities has recently been progressing more rapidly in Ohio than has in this state, according to a survey just completed by W. E. Collander of the U. S. Bureau of Crop Estimates and the Ohio Bureau of Agricultural Statistics. This survey, which is based on records of from 100 to 300 farms in each

county, shows that in June this year there were 70,000 men and boys over 15 years of age who were working for wages on the farms of Ohio. The previous year 100,000 men and boys were so employed. This is a decrease of 30,000 men, or 30 per cent, a most surprising change for one year. New York State farmers were much disturbed by the shortage of farm labor last spring, but the decrease here was only about 15 per cent.

The Ohio figures also show that, exclusive of hired men, there were 310,000 men and boys on the farms in June, and 370,000 at the same time last year. This is a decrease of 30,000, or 8 per cent. During the same period the number of vacant habitable houses on farms increased from 18,000 to 29,000, an increase of 61 per cent.

These figures are worth careful study, for they show how quickly men flock to the cities when industrial wages are high.—*New York State Fruitgrower*.

Pointers on Ordering a Tractor

(From Tractor Farming)

IN VIEW of present business conditions it is only natural that many farmers who contemplate buying a tractor for 1921 should put off ordering until they have an opportunity to see whether prices will be lower next spring. At first glance this would seem to be the most sensible course to follow. Taken altogether, however, it is best to order a tractor now, especially if a guarantee is obtained that if the price is reduced next spring, the amount of reduction will be refunded.

There are several reasons why it will be better to have the tractor delivered this winter than to wait until time for the spring work to begin.

Most any tractor owner will say that he failed to get the best possible results from his tractor during the first few weeks' use, because whoever operated it was not thoroughly familiar with the proper care and operation of the outfit. It is, therefore, desirable that the tractor operator should have an opportunity to familiarize himself with the operation of the machine before the spring rush begins. By having the tractor delivered now or some time during the winter, it can be used for many odd jobs of belt and drawbar work about the farm or for neighbors. Many of these jobs will be easier on the tractor than will the heavy work of plowing and hence they make an ideal way to "break in" the tractor.

Most men know better than to take a brand new automobile and drive it full speed for long distances or pull it through long stretches of sand or heavy mud until after it has been "limbered up." Long experience has shown that it pays to drive an automobile slowly and carefully for the first few hundred miles while all bearing parts are wearing in and acquiring their polish. This practice is even more desirable for the tractor. Plowing is about the hardest work most tractors are called upon to do, and the new machine should not be put at this work until after it has been run for a number of hours at lighter jobs.

Cylinder walls, piston rings and other bearing surfaces, no matter how carefully machined or how fine the "cut" made in machining, are at first slightly rough. If these surfaces are well lubricated and the engine is run for some time under a light load, they will take a

high polish with very little wear, and after this polishing or smoothing up is accomplished, the wear will be very slight provided the lubrication is properly looked after.

The advantages of early delivery, however, are not all confined to the tractor itself. It is highly desirable, as already pointed out, that the operator should be familiar with the care and operation of the machine before the rush season begins. Just as many automobile drivers suffer delays and inconvenience because something does not work just right about their car and they are not familiar enough with it to locate and remedy the trouble, so some tractor owners are delayed on account of minor misadjustments which would be located and remedied in a moment's time by an experienced operator. Even if a man is familiar with automobiles and other gas engines, it will nearly always require some time for him to master fully the proper care and operation of a particular tractor so as to be able to obtain the best possible results.

Taken all together, the man who orders a tractor now has a great deal to gain and nothing to lose, provided he is guaranteed against a reduction in the price of a machine before spring. As everyone knows, transportation is not as swift and certain as could be desired, and delays in delivery are always a possibility when the order is not placed until the working season is about to begin and hundreds of farmers are buying tractors. It will be easier to get delivery if an order is placed at once, and if any parts are missing or anything is wrong about the machine which has been overlooked in the inspection and test at the factory, there will be plenty of time to have these things looked after before the tractor is urgently needed. Ordering a tractor is one of the many things which should not be put off when it can be best done today.

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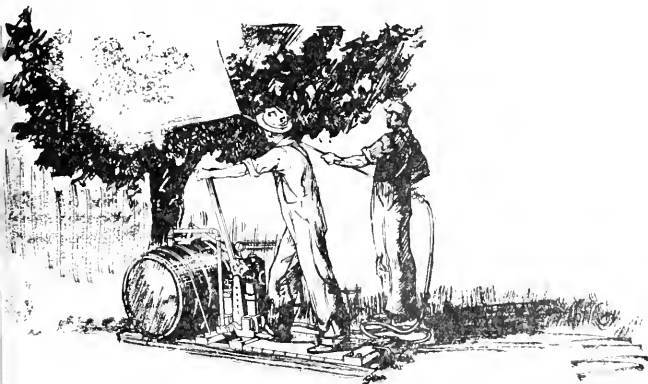
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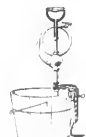
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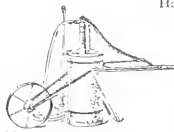
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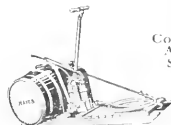
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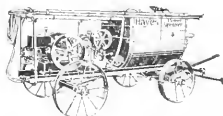
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Oregon Horticulturists in Annual Meeting

FROM all parts of Oregon fruitgrowers met during the early part of last month to attend the 33d annual convention of the Oregon State Horticultural Society. A number of valuable papers were read before the convention, while features outside of the regular business transacted were a visit to the plant of the Eugene Fruitgrowers' Association and a banquet on the concluding day of the session.

The meeting was presided over by J. O. Holt, president of the State Horticultural Society. In referring to the outlook for the fruit industry in the state at the present time President Holt said that fruit growing as a whole has been profitable during the last two or three years and that this season prices opened up at a very high level. Like those of other commodities, however, prices have been obliged to come down and this downward movement has gained such headway that there seems to be nothing to do but hold unsold fruit until such time as there is a more satisfactory market.

A resolution of importance that was

adopted was to the effect that the legislative committee be instructed to formulate grading and packing rules covering all fruit products after a conference with representative commercial growers of the state. It is planned to have the proposed law conform as closely as possible to the measure now in force in the state of Washington.

Some of those who addressed the convention were John McGee of Orenco who spoke on two new varieties of prunes that are attracting considerable attention, Joseph Nibbler of Woodburn, W. G. Allen of Medford, J. B. Pilkington of Portland, A. A. Quarnberg of Vancouver, Wash., C. I. Lewis and R. C. Paulus of Salem, of the Oregon Growers' Cooperative Association, C. A. Parks and Henry E. Dosch of the Oregon State Board of Horticulture. Interesting features of the program also was the recital of the history of the society given by Homer C. Atwell, former president of the society, and addresses given by H. P. Barss, plant pathologist, and W. S. Brown, chief in horticulture at the Oregon Agricultural College.

Forest Grove was chosen as the next place of meeting and the following were elected as the officers of the society for the coming year: Earl Pearcy of Forest Grove, president; A. C. Brownell of Portland, vice-president; C. A. Minton of Portland, secretary and treasurer, and Henry E. Dosch of Hillsdale, trustee. The legislative committee consists of R. C. Paulus, Salem; C. A. Parks, Salem; Albert H. Marsh, Roseburg; Ira Hutchins, Corvallis; L. T. Reynolds, Salem.

Market for American Fruit in China

China has within her boundaries one-quarter of the total population of the world and the mass of her people are fruit lovers. A certain amount of American fruit, both fresh and dried, has already found its way into the Chinese fruit stores, but the opportunities for expansion are immense. Hitherto the high-priced imported fruits have been consumed by the wealthy class, but the Bureau of Markets, United States Department of Agriculture, points to the significant fact that the wage-earning ability of the Chinese is gradually increasing. Market specialists conclude that it will not be long before the mass of the Chinese people will be ready to buy foreign fruits.

Japan is the sharpest competitor in the Chinese fruit market but should offer small resistance to a well-planned campaign by American fruitgrowers. The Japanese apples are far inferior to the American product and do not command the same prices. The Bureau of Markets recommends that the fruit dealer who seeks business in China use the trade channels already established. The Chinese are extremely conservative and do not welcome new systems to replace the ones they have in use.

One present drawback to foreign business with perishable products is due to the fact that the cold storage facilities at the principal Chinese ports are inadequate. The Chinese have understood the principles of cold storage and have practiced its method for centuries, but it has been only in recent years that her foreign business has been of a nature to demand large warehouses equipped to hold merchandise from other countries. It will be profitable for the American end of the industry to encourage the building of such warehouses where fruit can be held subject to the demand of the merchants.

The rate of duty on fruits is not sufficiently high to interfere with the development of the trade. For fresh and dried fruits the rate is 5 per cent ad valorem plus 5 per cent of the duty as a port charge. A box of apples valued at \$2.00 would pay a custom charge of ten and one-half cents.

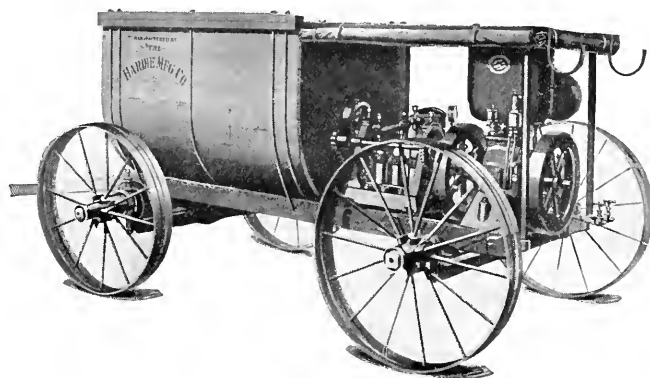
Additional facts of value concerning the opportunities presented to the American fruitgrower by this great undeveloped market can be found in Circular 146, United States Department of Agriculture. The circular gives an intimate and extensive report on the condition, customs, and possibilities of China as a market for American fruit products.



OLDEST APPLE TREE IN WASHINGTON.

Steps will be taken by the Washington Horticulture Association to preserve the original apple trees in Washington. The oldest tree is believed to be a seedling at Vancouver, Wash., planted in 1821. A question as to second honors in respect to age has arisen between the "Frazier tree" at Walla Walla and one at the mouth of the Aloua River near Clarkston planted by missionaries 80 years ago and still bearing fruit.

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Pruning for Efficiency

By Hon. W. P. Sawyer at the Northwest Fruitgrowers' Conference, Spokane, Washington

I HAVE been asked to say something about pruning for efficiency, which I suppose means to induce the trees to bear fruit and of a quality that will command a market and good prices.

I hear a good deal of talk about "thinning out versus cutting back," which I confess has always puzzled me. The question that always arises with me is: Why the "versus"? Why not do both?

My experience has been mostly with Bartlett pears and what little I shall say will be based altogether upon my experience and not at all upon theory. I make no claim to being an expert and I know very little of a professional's ideas of pruning.

A tree that will not set and develop a proper crop of fruit is not a good tree, neither is it a good tree if it has not sufficient strength to carry its load to maturity without props. Two things are essential to the development of either good fruit or good trees: Sunlight and air. Neither fruit nor fruit spurs and buds can be developed in the shade; so in instructing my pruners I impress upon them, first of all, the necessity of thinning out sufficiently to let the sunlight and air reach the trunks and whole length of the main limbs of the trees; this will cause the growth of fruit spurs all along the trunks and main limbs, where the trees have the greatest strength with which to support the fruit crop until it is fully developed, and these parts of the trees are stiff and rigid and protect the fruit from being slammed about and marred by heavy winds. With the light and air reaching all these parts the same ruddy attractive fruit is produced there as that which grows on the outside of the trees.

The next thing to explain to the pruner is the necessity for a strong frame that can carry the burden of a proper crop without props or strings on fully developed trees. This can be accomplished only by continually cutting back the new growth so that the limbs

will grow thick and strong in proportion to their length.

To secure the style of trees that I have described we begin by cutting the tree back to fifteen inches from the ground when planted. The next year we cut the new growths back to 12 to 16 inches in length and thin out to from three to six branches that will make a balanced head; cutting at all times to terminal buds that point out or against the wind. In most sections of this country the winds prevail very largely from one direction and the trees must be braced against these winds or they will soon be seen to be leaning with them—this is wholly unnecessary if proper care is used in shaping head and in pruning. I do not like a hollow center so I always try to have one of the main branches go straight up and then by careful selection of buds and cutting to them or to little branches that point either out or against the wind, we help the tree to spread out and stand up-right. If there are but three branches to start with the second year they should each be allowed to make at least two main branches, and after that I believe we would do best to allow no more long branches to grow, but keep these six main limbs clear of everything but short fruit spur branches. You can readily see how easy it would be to keep fruit grown on such branches all in the sun. Until the trees are practically developed we prune each year as I have described. No brush is allowed to grow on the main limbs and no clusters of sprouts are allowed on the ends of these limbs but every limb is pruned to one shoot at the point and in the developed trees we never allow any fruit buds to remain nearer than one foot from the end of a main limb; this is the weakest spot on the tree and the place where the wind can do most harm to the fruit. We do not allow the trees to grow taller than can be reached from a 12-foot ladder and all growth above that we cut back each year to one or two buds on one shoot and cut all

other shoots clear back to old wood. On the main spreading limbs we cut off clean, substantially, all new growth excepting fruit spurs and one shoot at end of limb and this we cut back to six or eight inches in length. In this way we prevent shading brush from ever getting established in our trees and avoid the necessity of cutting out old

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wood, which I do not like to do, but never hesitate to do when I find I have too many limbs and my tree is not sufficiently open. When cutting wood more than one year old I will cut a branch considerably shorter or longer than I would like to in order to be able to cut off where it branches, because when old wood is cut otherwise a great number of fine shoots are thrown out all of something the same length, making the end of the branch cut look more like a brush than the proper end of a branch.

This is not very long and it does not sound very scientific, but so far as I

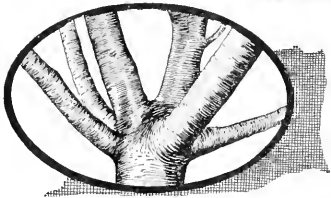
can think I have told you all I know about pruning. When we once understand why we prune, and what makes attractive fruit, then it is not so difficult to properly prune any kind of a tree, if we will just use our own good common sense and reasoning powers.

I have not told you why it takes the sun to put color and quality into fruit, nor is it necessary to do so since every fruitgrower knows from his own experience that it is a fact. Then the only thing of interest is to find out the best way to get your fruit into the sun, and to build a tree that can support it till the proper time comes to pick it.

Spreader Reduces Cost.

Lead arsenate spray of half the usual strength, combined with a spreader, proved much more effective than the usual strength—4 pounds to 200 gallons water—without spreader, in tests for codling moth at the Oregon Agricultural College experiment station. The spreader used was calcium caseinate, 12 ounces to 200 gallons of spray. The gain was due to the even, uniform coating of poison with the spreader, as against a blotchy spread without.

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MANY GROWERS in the Northwest, who have experimented this past year with unsatisfactory sprays, have lost enough to pay the entire cost of spraying with Scalecide for many years.

Scalecide has seventeen years of known results behind it. Experiment Stations in both the West and the East report 100% control of leaf roller and scale with Scalecide. Names of Bulletins will be furnished upon request.

Only five per cent extra clean fruit will more than pay for Scalecide and the cost of applying it. Spray with Scalecide this year—don't take chances. Experiment with other sprays, if you want to, then you will know what to use in the future. *We welcome comparison.*

Six gallons of Scalecide to 100 gallons of water is all that is required.

One hour after Scalecide is dry on the tree, it has done its work. Rain will not affect its efficiency after that.

Scalecide mixes instantly in hard, soft or

alkali water, whether warm or cold, and stays mixed.

You can use Scalecide up to the time when the blossoms show pink. This controls Aphis, too; also bud moth and case bearer. For blister mite spray before the buds show green.

Scalecide is not expensive. One barrel of Scalecide will spray as many trees as 3½ barrels of 33° lime-sulfur or 4½ barrels of 28° lime-sulfur and do it more thoroughly and with a big saving in labor of applying.

Freezing weather does not affect Scalecide, so order now and have it on hand when needed.

We will deliver Scalecide to your railroad station at \$55.00 per 50-gallon barrel direct from our New Jersey factory. Associations or growers who order in carloads of 68 barrels can save from \$5.00 to \$10.00 per barrel.

We ship any amount promptly. But, remember that the railroads require from 30 to 60 days for delivery to the Northwest. Therefore, order your requirements immediately.

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THE COMPLETE DORMANT SPRAY

SCALECIDE

"Makes a Tree Outgrow Its Troubles"

Northwest Fruit Notes from Here and There

OREGON.

According to a recent report from Roseburg, Kenneth McKay, a well known orchardist of Yakima, Washington, and Hood River, Oregon, has leased from the Balfour Guthrie company of Portland approximately 300 acres of apple orchard land in the Sutherlin valley. Included in the lease are several thousand dollars' worth of equipment used to care and cultivate these orchards. It is understood Mr. McKay will erect a large packing house early in the coming year to handle the fruit and that extensive development of the industry in that section will be undertaken.

The Portland press recently announced the receipt at that port of several large cargoes of nitrates which will be used in Oregon orchards. Growers who are contemplating the use of nitrates are advised by the Oregon Agricultural Experiment Station that they can learn much about the use of nitrates by applying to the college for the station bulletin on that subject.

Oregon apples were sent to President-elect and Mrs. Harding to brighten their Christmas. The apples were sent from Hood River and consisted of a box of selected apples of assorted varieties. The fruit was sent to Mr. Harding by W. H. McClain who formerly resided in Marion, Ohio, the future president's home city. President Wilson received a box of fine Mosier apples forwarded to him by G. L. Davenport, a Mosier orchardist.

W. H. Paulhamus, president of the Puyallup & Sumner Fruit Growers' Canning Company, in reply to a recent inquiry as to what the company would pay for fruit in 1921 says

that the organization is now contracting for Munger black raspberries at \$110 per ton; gooseberries at \$100 per ton; rhubarb at \$20 per ton; red and black currants at \$110 per ton, and Monmouth sour cherries at \$100 per ton, f. o. b. at their Albany cannery. The company at the present time is not quoting a price on loganberries and sweet cherries.

The completion of the harvest of the 1920 cranberry crop in Clatsop county is reported to show a total of something over 5,000 bushels, an amount considerably below what was expected earlier in the season. Wet weather during the picking season caused a large percentage of the berries to become soft, entailing a considerable loss.

A report from Salem is to the effect that split prunes, which heretofore have been almost valueless except for local consumption, are being shipped from Marion County to eastern states, where they are commanding 8 cents a pound. States bidding for this variety are Montana, Wyoming, Idaho, North and South Dakota. Arrangements are also in progress whereby large shipments of prunes may be sent to Hamburg, Germany, the cost of transportation being 56 cents for each 25 pounds.

A merger was recently completed between the Jackson County Farm Bureau with headquarters at Medford and the Ashland Fruit & Produce Association whereby the two organizations will work to promote the agricultural and horticultural interests of that district. The cooperative movement between the two organizations was brought to a satisfactory conclusion at a meeting held recently by the directors of the respective concerns.

Strawberry growers of Clackamas County have taken the necessary steps to organize a strawberry plant growers association. The strawberry plant industry in that section is said to amount to more than \$90,000 annually and to be increasing.

Due to the claim of California horticultural officials that strawberry plants being shipped from some sections of Western Oregon were affected with weevil, plants shipped from Oregon to California hereafter will first be inspected in the former state by experts before shipment. This action was taken by the Oregon State Board of Horticulture after a meeting held recently with L. A. Strong representing California quarantine officers. An immediate inspection will also be made of strawberry fields in several of the Western Oregon counties, under the direction of B. D. Fulton, an expert from the Oregon Agricultural College.

According to a report issued about the 15th of the past month the 1920 Hood River apple crop was at that time practically in the hands of the shippers. The report says that the total output will run more than 100,000 boxes above pre-harvest estimates. The Hood River Apple Growers' Association which estimated its harvest at 850,000 boxes expects its total receipts to be 950,000 boxes. The valley's total crop this year is estimated at 1,350,000 boxes. The association had shipped up to December 15, 50 per cent of its holdings. No pronounced car shortage has occurred at Hood River and it is expected that the remainder of the crop amounting to about 500,000 boxes will be shipped without any difficulty.


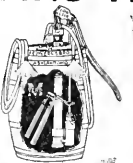

According to an announcement of the Apple Growers Association, many members of the organization are expressing a keen interest in raspberries, loganberries and pears, says the Hood River Glacier. Growers express a de-

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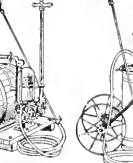

FOR SPRAYING - PAINTING AND DISINFECTING

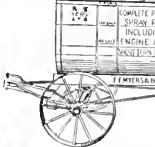






You may not gauge your success in the growing of fruits and vegetables by the spraying you do. Failures sometimes occur but they are less frequent where spraying has been carried on. Consequently, spraying is of vital importance. It is crop insurance. Almost as necessary as good weather. It reduces the chances of failure and pays big dividends in larger and better yields. You can't afford to do without spraying, neither can you afford to waste your time and efforts by using poor materials and a cheap spray pump.

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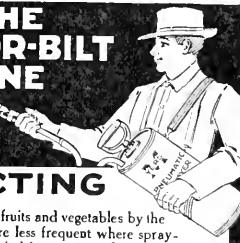




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sire, it is stated, to diversify their orchard holdings, especially where, owing to the injured condition of trees from the freeze of last winter, it is necessary to remove certain blocks of trees and to reset to fruit or berries. The association is making a survey of acreage that will be available for new plantings this spring and is obtaining data on proposed new fruits.

Forty thousand acres of prunes are now to be found between Portland and Ashland, as compared with 10,000 acres a few years ago, according to a survey made recently.

The Oregon Agricultural College Experiment Station notes that it cost a flood River grower 76 cents a tree to spray his orchard seven times in the season, and he got 95 per cent fruit free from leaf roller, codling moth and

apple scab injury. His neighbor under like conditions paid 55 cents a tree for seven sprayings. He saved 21 cents in spraying, but lost 101 cents per tree in damaged fruit.

A delegation of Rogue River valley orchardists recently visited California for the purpose of investigating the long pruning system being studied by the California State Agricultural College. As a result of the trip it is stated that the new system may be adopted with some modifications in the Rogue River section.

Raspberries and pears are being urged at flood River as the fruit crops to plant where orchards were irreparably damaged by the freeze last winter. To inform growers on this question experts will investigate and discuss the matter with the growers.

WASHINGTON.

W. C. Dumas of Selah announces a remarkable yield last season from two Gano apple trees. From one tree 61 boxes of fruit were picked and from the other 50 boxes.

Motor trucks are moving a considerable quantity of apples from the White Salmon district to Portland this year. Growers who use the motor truck service say it is quicker than shipping by rail and less expensive as the fruit is delivered direct to the buyer and requires less handling.

More than 50 per cent of the berry acreage of the Puyallup-Sumner valley has been enrolled with the Pacific Berry Growers, a new agency being organized in that district according to one of its officials. To determine the exact berry and fruit acreage in the district a census will be taken. The president of the new organization is E. R. Thomas and the treasurer is George Spinning.

Grays Harbor County orchardists should cut down all their apple trees, except a few for their own use and plant cherries and pears, according to an announcement of County Horticulturist Payne. Mr. Payne takes his stand on the ground that Western Washington cannot compete with Eastern Washington in growing apples commercially, because climate and soil are both against successful apple growing.

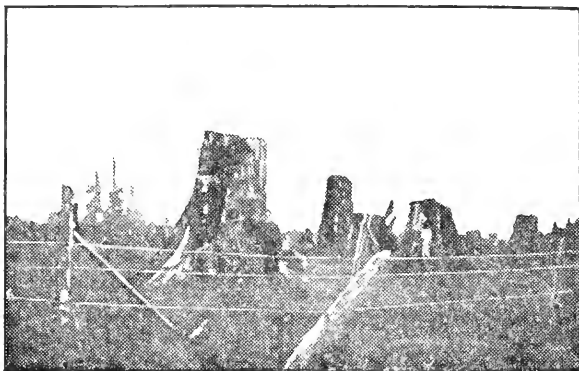
In regard to framing a tariff law that will protect the fruit industry of the Northwest, a matter recently taken up by W. H. Paulhamus, of the Puyallup & Sumner Fruitgrowers' Association, Mr. Paulhamus has received word from Senator W. L. Jones of Washington that he can be counted upon to do all in his power to have such a law enacted. He suggests, however, that Mr. Paulhamus or someone equally familiar with the fruit industry take up the matter with all the senators and representatives.

Believing that the beekeeping industry of the state has assumed such proportions that it deserves more recognition from state authorities the Grays Harbor Bee Keeping Association will send a petition to the legislature asking for an appropriation to fight diseases which are affecting the bee colonies of the state.

With the thought in mind of helping home industry as well as observing the Christmas spirit prunes from Clarke County were sent into every state in the United States during December as present by persons living at Vancouver, Wash. The prunes were especially packed in ten pound boxes under the brand name "Mellowest," recently adopted by the Washington Growers' Association.

The California Nu-Fruit corporation has been organized at Yakima with W. H. Cloud, food specialist for 25 years, as president; F. M. Raymond of the Yakima Artificial Ice and Cold Storage Company, vice-president, and A. V. Hooper, secretary-treasurer. The company will at once begin manufacture of apple lozenges, a new food product. The lozenges are made from dehydrated apples which are electrically toasted until the slices become golden brown crumbs.

The Wenatchee District Cooperative Association has been organized. Plans for a membership of 65 per cent of the Wenatchee growers, a fund of \$150,000 to be spent in advertising a standard brand, arrangements to



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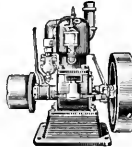
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create a working surplus large enough to meet all requirements, and the establishment of connections in the East to handle a large percentage of the tonnage, have been completed by the Wenatchee District Cooperative Association, according to H. G. Boehlke, president of the newly formed fruitgrowers' association, who was in Spokane recently. "We have already signed up 735 carloads of the 1921 crop in the valley, and we have every reason to believe that we are going to obtain the support of 65 per cent of the growers in the four counties comprising our district," he said. "Three cents will be levied on each box of fruit to pay the advertising bill, which will be spent advertising one brand for the entire district." The chief features of the plan adopted by the Wenatchee District Cooperative Association are the centralization of all authority in trustees and officers. All growers who join must sign up for five years, and must place their entire crops in the hands of the association's officers to dispose of to the best advantage. Pools are provided for, settlement for which is to be made at fixed dates, and all returns are to be made equally to growers according to the number of boxes of fruit sold.

Reports that winter apples held in community storage in the Wenatchee district are damaged are emphatically denied by District Horticultural Inspector Darlington, who has made careful examination of Winesaps in the district, both in the orchard and track storage. Mr. Darlington reports that there are no indications of detrimental water, core or other breaking down of the cells.

Apple shipments from Yakima continue to decrease, only 262 carloads having been rolled to the market during the week ending December 12 as compared with 367 the previous week. Total apple shipments for this season are 5,708 cars with a valuation of about \$8,000,000. There have now been 7,676 carloads of fruit rolled from the valley this year, compared with 13,147 cars at the corresponding time a year ago.

Regarding car needs for fruit of the Wenatchee district next year Edwin Swith, manager of the Wenatchee Valley Traffic Association, says: "Wenatchee requirements for 1921 without doubt will be from 40 to 60 per cent greater than they were this year. Orchardists advise that trees were never in a better con-

dition to produce a bumper crop and 15,000 carloads for the district is being freely mentioned. To meet this there promises to be about a 10 or possibly 15 per cent increase in new refrigerator equipment on the railroads.

IDAHO.

W. M. Crapp, manager of the big plant of the Oregon Packing Company at Lewiston, Idaho, has closed the plant until the beginning of the next cherry season. Although the market for canned goods was unfavorable last season, the plant did a big business and recently has made large shipments. Nearly 1,000 tons of tomatoes grown locally were packed, a great increase over last year, when growers were just beginning to raise this crop in commercial quantities. The cherry pack ran about 500 tons and several hundred tons of other fruits were packed, including apples, which furnished the cannery with steady work during the fall. The payroll of the plant is \$60,000 annually.

"The growing of seed potatoes has become an established industry in Northern Idaho, where only a few years ago potatoes for this purpose were not grown," said E. R. Bennett of Boise, Idaho, field horticulturist of the state university of Idaho, while in Spokane. "The whole thing has been in the growing of a single variety," he added. "They have united on the Nette Gem, the potato which has made the Northwest famous for its potatoes, and the result is that they are sold out at a premium."

Leroy Weston, manager of the Spokane Fruit Growers' Company, states that the apple packing season has closed at Coeur d'Alene, Idaho, 40 miles east of Spokane, and that 81 cars of apples were shipped from the Coeur d'Alene district as follows: Forty-eight cars from Dalton Gardens warehouse, 21 cars from the Coeur d'Alene warehouse and a miscellaneous shipment of 12 cars by the independent shippers of Hayden Lake-Dalton Gardens district.

Mulching of trees and shrubs with manure late in the fall tends to protect the roots from freezing and thawing and also helps to hold moisture in the soil.

Ship Your Fruit TO Europe BY Holland-America Line Refrigerator Steamers

Regular Monthly Direct Freight Service
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Scores of orchardists have written enthusiastic letters recommending this heater. One ranch has used over 1000 of them for three years with entire satisfaction.

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Notes Oregon Growers' Association

With the rather bad weather to be expected during the next few weeks, the fruit grower can put in his time on inside work, such as mending boxes. It is also suggested that now would be a fine time to re-model dryers if necessary, rather than to wait until the busy season.

Growers who have pruning might begin now to relieve the rush of work next spring.

Good results are obtained by the application of the nitrate of soda on loganberries during the month of March. Some report increased diameter as well as length of cane. Those who intend to use this fertilizer should be placing orders.

The business of the Oregon Growers' Cooperative Association has assumed such proportions that during the month of November, checks were issued for \$540,199.23 by the association and its affiliating company, the Oregon Growers' Packing Corporation according to a report of W. I. Staley, secretary and treasurer.

The good results of advertising and cooperation were shown in an address recently delivered by C. I. Lewis of the Oregon Growers' Cooperative Association, before the State Horticultural Society, in session at Eugene. Four years ago, Mr. Lewis said, the peach growers of California were a discouraged lot. Many trees were grubbed out as peaches were selling for two cents a pound, below the cost of production. The growers got together, formed a cooperative association and by judicious advertising, created a demand for certain peaches. This year the crop was sold for \$8,000,000, an average of \$30 a ton to the grower. The California Peach Growers' Association is now four years old. It has 6,500 members and controls 10,000 acres. Cooperation among growers, Mr. Lewis said, had in four years brought the peach industry in California from almost financial ruin to an established, prosperous business.

The growing of filberts is urged by the Oregon Growers' Cooperative Association, as there are just two states growing them commercially, Oregon and Washington. Already there is an active interest in filberts and many are preparing to put in tracts of from five to twenty acres. There are now only from 40 to 50 small tracts in Western Oregon. Filberts grown in this state are of a much finer quality than those imported from Spain, Sicily, and Turkey. There is a commercial crop about the fifth year from planting. As there are fully 10,000 acres of logged off land in Oregon adapted to the growing of filberts and English walnuts, it is predicted that within a few years, the growing of nuts will be one of the great industries of Western Oregon.

What They Are Doing in California

According to advices to the California Department of Agriculture, on December 18 there will be a total of 2,200,000 boxes of apples shipped from the Watsonville section this season or approximately 300,000 boxes less than was shipped last year. There is in cold storage about 200,000 boxes, loose and packed, at Watsonville and about 400,000 boxes in other cities throughout the state, mostly in San Francisco and Los Angeles. In addition there is some stock in common storage.

Opportunity for Pacific Coast orchardists, vineyardists and ranchers, for the disposal of surplus production, in the markets of the Far East, will shortly be afforded by the installation of a line of fast, modern, combination freight and passenger carriers, to be operated from San Francisco to Manila and East Indies by the Pacific Mail Steamship Company. It is officially announced. This highly improved service will be initiated by the Shipping Board steamers "Creole State" and "Wolverine State," these vessels being due to arrive from the Atlantic in January and February. The announcement is of special interest to the fruitmen of the Pacific Coast, because the ships were, at the suggestion of the Pacific Mail Steamship Company, particularly designed to care for the transportation of the ranch production of the Western Slope and marks the beginning of a service which provides the necessary refrigerating space for commodities that could not be otherwise sent out of the United States. The ships will be operated in the Manila-East India Service

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which was established by the Pacific Mail Steamship Company.

The S. S. "Creole State" sailed for San Francisco from Baltimore on December 27th. Arriving at San Francisco on January 15th, she will load cargo, and on January 26th will be dispatched on the Pacific Mail's direct express communication with the Philippines and India. The S. S. "Wolverine State" will sail from San Francisco on February 25th. Direct express communication to Manila will be made by the new liners in 22 days. The time from Calcutta will be 31 days, the "Creole State" and "Wolverine State" making the fastest time in the history of Pacific trade with the Far East. Leaving San Francisco the ships will reach Honolulu on the afternoon of the sixth day; the Philippines in 22 calendar days, and arrive at San Francisco from Manila in 20 calendar days; Singapore will be reached in 28 calendar days from Calcutta; Colombo in 33 days; Calcutta in 29 days; and will make San Francisco, homebound, in 34 days, from India. Sailings will be maintained every 30 days from San Francisco, excepting when Sunday interferes when sailings will be on the Saturday preceding.

Bits About Fruit, Fruitmen and Fruit Growing

Cheering words were recently brought to Northwestern apple growers by A. B. Hull of Gasport, N. Y., production manager of the E. A. Sprayer Company, who visited F. A. Olmstead and A. B. Bennett who are the Oregon and Southern Washington distributors for this company. According to the Hood River Glacier, orchardists of the Northwest, he says, should not be depressed over the situation that now applies in the apple market.

"It must be remembered," says Mr. Hull, "that the big eastern commercial orcharding districts this year produced a record breaking apple crop. As a result all eastern points of distribution have been glutted as never before in history. Naturally, the apple market has dropped. It is a wonder that it has held to the point maintained. Even as I was leaving the East, however, this heavy glut of barrel stock and bulk apples was being cleaned up and the outlook was much brighter for the high class box product of the Northwest. It has been the experience of the past that big crops have never repeated, and we may expect a smaller or moderate crop of apples in the East next season, whereas the West is due for a bumper yield. I find that most of the representative Northwestern growers are viewing the orcharding situation from a general angle, and are not allowing the present condition to alarm them. Growers are going right ahead in laying out appropriations for better equipment, and care of fruit tracts will not decline. We are looking forward to a much increased business."

Losses from freezing of Northwestern apples were extremely heavy last winter. During December and January, 1919-20, claims of \$3,000,000 were presented to railroads by apple shippers of Washington, Oregon and Idaho. Prevention of loss by freezing in transit seems to depend largely on improved methods of heating cars. Serious losses occur also in shipments of potatoes. Information and advice on lining, heating, loading box cars for potatoes in winter have been supplied by the U. S. Bureau of Markets to shippers and producers and the methods recommended have been extensively adopted. A heating system suitable for installation in ventilator and refrigerator cars has been designed by investigators of the U. S. Bureau of Markets, and has been approved by various railroads as a standard for the equipment of refrigerator cars under conditions which warrant the building and operation of these cars. The experimental cars equipped with this system of heating will be used in comparison with cars equipped with portable heaters.

The big stride that the fruit industry in Oregon has made was called attention to recently by W. S. Brown, chief in horticulture at the Oregon Agricultural College, in an address recently before the Western Society of Naturalists which met at the college at Corvallis.

"From 1850 to 1870 fruit was so scarce in Oregon," said Professor Brown, "that fabulous prices were received, one box of apples having been sold for as high as \$75, while in 1855, 6000 bushels of apples sold for prices ranging from \$20 to \$30 a bushel. In 1909 there were 4,000,123 bushels of fruit in the state, valued at \$3,310,000, while in 1919 there was produced, according to the best information obtainable, some 9,000,000 bushels of orchard fruit, with a valuation of approximately \$16,000,000. The total fruit crop of the state for

1920 will run not far from \$25,000,000 to \$30,000,000. There are many vexing problems ahead of the industry, and there always will be, but taking everything into consideration, the outlook seems very fair."

The use of cider in the home by its manufacturer, even after it has become intoxicating is lawful and without the bounds of the prohibition enforcement act, according to an opinion submitted by Attorney General Palmer and recently made public. The opinion is in conflict with the regulations of the bureau of internal revenue which states home made cider must be "non-intoxicating in fact," although not necessarily containing less than one-half of one per cent of alcohol. The Anti-Saloon League, it is reported, has asked the attorney general to reconsider his ruling on cider, declaring that the eighteenth amendment prohibiting the manufacturing of intoxicating liquors for beverage purposes in the home or elsewhere and that Congress fixed the alcoholic content of fruit juices for home use at one-half of one per cent.

Cannery Notes

Additions of two new departments, jam and preservers and vegetable canning, to the A. Rupert Company, incorporated, of North Puyallup, was announced recently at Puyallup,

Wash., at a banquet when 125 representative business men and berry growers from the valley were guests of the company. Representatives of the Puyallup Valley Fruit Growers' Union and the Pacific Berry Growers' Association were also present. W. A. Frost, president of the A. Rupert Company, to meet whom the banquet was arranged, made the announcement offering for sale to the berry growers and business men stock in the enlarged corporation. This is the first departure of the Rupert company into the jam and preserve business.

The Altoona Packing Company has plans well under way and construction started on a large modern cold storage plant, which it is building at Astoria.

There will be many important topics of discussion at the Fourteenth Annual Meeting of the National Cannery Association to be held at Atlantic City, Jan. 17-21. The Canning Machinery & Supplies Association, and the National Canned Foods and Dried Fruit Brokers' Association will assemble at the same time. A new feature to be introduced at the 1921 convention, and of particular interest to the consumer, will be a canned foods demonstration. Because of the unsurpassed facilities afforded by the great pier space the exhibit of machinery used in canning, a display made

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by the Canning Machinery & Supplies Association, will be more elaborate than ever before. Heretofore this exhibit has not been open to the public, but at Atlantic City the exhibition will be open evenings to the general public.

Expenditures by the Libby, McNeill and Libby Company last year at Yakima, Wash., according to the annual report by George B. Kile, superintendent, exceeded \$60,000. The cannery is open from May 1 to November 1, covering the canning season, from May until December, and the total payroll amounted to \$325,000. Approximately \$325,000 was paid during the year for produce, including spinach, cucumber pickles, green beans, and corn. While no definite plans for extension of the plant, which now includes cannery, warehouse, apartment house, eight cottages and a garage, have been announced, various indications are that some material improvements will be made. The cannery is making efforts to induce farmers to plant more out-of-season crops, such as green beans, and is lengthening the season during which the huge plant may be operated. During the season about 120 tons of spinach were canned into 120 tons of pears, 100 tons of apples and 100 tons of cucumber pickles. 742 tons of cherries were canned or made into maraschino, 2,000 tons of pears were canned and about the same amount of cut apples. The last of a 10,000-case order of apples for the United States government was recently shipped.

The Skat Cannery Company, located at Sedro-Wooley, Wash., has just closed a very successful year. Work on this cannery started about the middle of April and the building was completed the first of July. Consequently the first berries were canned and put on the market in the latter part of July. Since then all other fruits and berries were canned. In addition a specialty was made of canning both beans and beets. A total of approximately \$700,000 was paid out for the purchase of fruit and for preparing the same for the market. Preparation of the fruit was waiting for a much larger run next year. Stock in this cannery is owned principally by local business men and farmers. J. W. A. Myers, formerly superintendent of the Skat farms of Bellingham, is the general manager.

J. W. A. Myers, manager of the Skagit Canning Company at Sedro-Woolley, Wash., heads the recently incorporated Skagit Berry Farms Company. This organization has just completed the purchase of a 100-acre farm on the outskirts of Sedro-Woolley, which it is intended to immediately develop into a diversified berry farm, but specializing chiefly in raspberries and loganberries. This farm is one of the best in Skagit Valley for this purpose, in regard to location, site and soil.

During the year just closed over 1,000 acres of berries were set out in the fertile Skagit Valley, Washington. These plantings consisted primarily of strawberries, raspberries and loganberries, with small scatterings of other kinds of berries. Considerable interest was shown in the planting of our cherries. Indications at the present time point to more than doubling this acreage during the coming spring. The Skagit Valley contains hundreds of acres of sandy loam, the ideal berry soil. During 1920 two canneries were erected in Skagit County, primarily to take care of this berry acreage: the Skagit Canning Company at Sedro-Woolley and the Burlington Canning Company at Burlington, Wash. Both reports are made that the erection of either another cannery or a juice factory receiving station in Mount Vernon.

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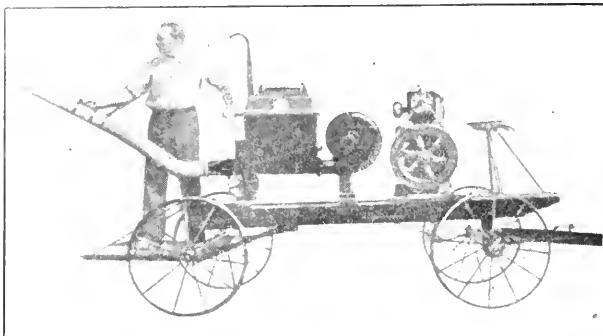
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Stock Influence on Scion, Etc.

Continued from page 4.

changes are the indirect result of a particular stock or the direct effect of the complicated changes wrought by the environment. Opinions on these remain still very vague and contradictory.

As early as 1879 Budd reported that he had many pages of evidence accumulated in his files stating that the stock of top grafted apples has an influence not only in respect to hardness and thrift of the scion, but the size, flavor and quality of fruit in particular.

Much, though very scattered and contradictory, opinion on this question is to be found in the transactions of many state horticultural societies. These evidences are, however, too unreliable to be marshaled as facts from which general conclusions could be drawn.

1. In respect to particular influences, Hedrick thinks that the color of the fruit may be changed by the stock, but that this cannot take place in respect to the characteristic color of the fruit. The color is brightened or diminished by the earliness or lateness of maturity of the wood, which can be influenced by the stock. As a particular instance he refers again to the orchard of McIntosh apples top grafted on Oldenburg, which matured its fruit nearly two weeks earlier than McIntosh on standard stocks, and, therefore, were much brighter in color.

2. There is hardly any doubt that the size of fruit is in some cases increased as a result of top working. Any beneficial influence exerted by the stock on the scion in respect to health and increase in vigor will show itself most readily in an increased size of the fruit.

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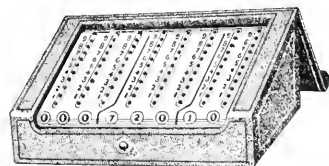
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Again, because of the nature of top working, each of the scions will behave like individual young trees, and thus, as in the case of most young trees, the first crops will be of a larger size than the subsequent ones. And it is the first crop of the top worked tree which attracts the most attention and from which often rash conclusions are drawn. This, however, does not exclude the often observed cases of a general and permanent increase of the size of fruit of many varieties as a result of top grafting.

J. A. Burton of Indiana reports that Grimes and Jonathan trees grafted on

Walbridge bear considerably larger fruits than when grown on seedling roots.

Many additional instances of an increase or decrease in size because of top working is to be found in transactions of many state horticultural societies. Other cases reported by practical fruit growers will be found below.

3. In respect to a change in eating or keeping quality of fruit because of top grafting, we have many reliable instances reported with grapes and other fruits grown in England through the pages of the "Chronicle." In respect to the causes of a change in quality of

fruit as a result of top working, Dr. Lindley, editor of the above publication, says that "this may be conceived to happen in two ways: either by the ascending sap carrying up with it into the scion a part of the secretions of the stock, or by the differences induced in the general health of the scion by the manner in which the flow of ascending and descending sap is promoted or retarded by the stock."

Many instances of a change in the eating quality of many varieties when top grafted may be found in the transaction of Iowa and other state horticultural societies. Other additional

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cases solicited by means of the above questionnaire will be given later.

Hedrick believes that larger, crisper, and juicier fruits with an increased or decreased degree of sweetness or sourness can be grown on some stocks than on others, but he does not agree with the opinion often expressed that the characteristic flavor of the fruit is changed because of the use of certain stocks.

The whole question seems to be of a very complicated nature and the observations very subjective, especially in the case of apples. Thus hardly any general rules can be drawn from evidence on hand.

This is more true if we consider the keeping quality of the apple as influenced by the stock. This question, though of great economic importance, has not come under general observation long enough to allow any opinions to be drawn from the scanty information that has been precipitated here and there. In general it can be said, however, that the keeping quality is not materially altered by the use of a certain stock.

Most recent opinions of practical horticulturists on the question of the influence of the stock on the top grafted apple, as solicited through the above questionnaire gave the following answers:

Has fruit been modified in respect to	Yes	No
Color	30	46
Size	48	41
Quality	22	45
Keeping quality	19	46
Total.....	119	181

Of these, there were thirty replies stating specifically that the size of fruit has been increased because of top working. Other seven growers are of the opinion that the effect on fruit is only an indirect one—by means of modifying the general health and vigor of the tree.

From these replies it is seen that while 39.5 per cent of the total answers received expressed the belief that the apple is influenced in respect to color, size, quality and keeping quality of the fruit, 60.5 per cent of those replying are of the contrary opinion.

As seen, a majority of the replies indicate that the size of fruit has been increased because of top working, while there are nearly as many who do not think so. The second most observed effect seems to be that of change of color of fruit. Yet only thirty people replying believed this to be the case, while forty-six are of the contrary opinion. But most of the replies state a negative belief concerning the change of eating and keeping quality of the fruit.

These answers seem to agree quite well with the opinions of well known

horticulturists of this country. While there seems to be more or less change in size and color because of the use of different stocks, there is but little evidence that the quality and especially keeping quality has been altered. Judging from the specific instances quoted

above, it would seem that the stock affects in many cases the flavor, especially acidity of the fruit. This appears to be particularly true in cases where there is a great difference in this respect between the fruit of the stock and the scion.



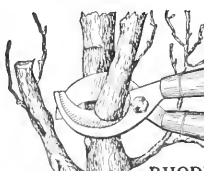
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The good tobacco taste lasts so long—a small chew of this class of tobacco lasts much longer than a big chew of the old kind. That's why it costs less to use.

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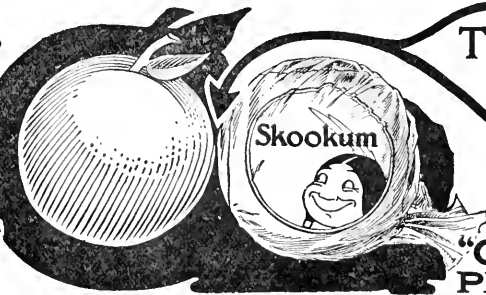
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With the Poultry

Inquiries Answered — Contributions Solicited

INCUBATORS SAVE TIME AND MONEY.

An incubator brooder is an important asset to every poultry breeder. The time to buy an incubator is in the fall or the early winter months, before it will be needed. By adopting this plan the purchaser can give himself a little time to learn something about operating the machine. In fact it is a good idea to make several experimental hatchings before the apparatus is put to the test at its full capacity. An incubator brooder is a big help to the Northern poultry breeder because it makes it possible to hatch the chicks early and allows them to get a vigorous growth before cold weather comes in the fall. Consequently they commence laying earlier and become profit makers long before the usual run of hen-hatched chicks.

To obtain the best results from an incubator it should be obtained in time so that it can be filled and set going during the last half of February. By this plan the chicks should all be hatched by the last of April and if properly housed and fed will become profitable winter layers. It requires study, patience and considerable work to raise chicks artificially, but the successful management of an incubator is not a task that will seriously burden anyone of active mind and industrious habits, and is not only a time, but a money saver.

GOOD TYPE OF POULTRY HOUSE.

A good type of poultry house is one that has a good sized scratching room and a small roosting and laying room with one small window, and a tight, closely fitting door. This insures a warm roosting place in winter. In summer the tight fitting door can be replaced with one made of slats. Instead of an open shed scratching room that may fill with snow in winter a large room with two sliding windows should be provided, or a large open space left in which can be hung a muslin curtain provided the climate is not too severe.

Wire netting can be placed over this space to keep the fowls in and the windows can be opened to any width desired according to the weather conditions. This gives the benefits of fresh air without its disadvantages.

The nests should have closed hinged fronts and should be so arranged as to be accessible from the rear. This will provide the ideal laying condition by keeping them very dark. This plan of poultry house is one that should meet the requirements of the average poultryist as it can be constructed at a comparatively small cost and may be built small or large, depending on the number of fowls to be kept.

PRODUCING WINTER EGGS.

A good daily ration to produce winter eggs particularly for early hatched pullets is a scratch grain of 10 pounds of shelled corn and 5 pounds of dry threshed oats. With this should be fed a dry mash of 3 pounds of wheat shorts and 1½ pounds commercial meat scraps.

Where milk is plentiful three gallons of skimmed milk or buttermilk furnished each 100 hens daily will take the place of meat scraps. Either milk or some form of lean meat should be supplied in every ration for successful winter egg production. Barley or feed wheat may be used instead of oats. Corn meal or ground oats may be substituted for shorts in the mash. Alfalfa or clover leaves may take the place of the dry mash or good grain of tankage may be used instead of the meat scraps.

In feeding this ration all grain should be fed in deep straw to compel the hens to exercise. The mash should be fed in self-feeding hoppers or troughs and a supply kept before the birds at all times. In addition to this ration there should be an abundance of water, a supply of green food and free access to sharp grit and crushed oyster shells as well.

BREEDING FOR EGGS.

The trapnest has come to be looked upon by poultrymen with large flocks as invaluable. In order to know accurately just how many eggs a hen produces and which are the non-producers and the profitable fowls the trapnest is the best method that can be used.

One of the most valuable purposes for which the trapnest can be used is to find out just how well the best of the flock is laying in order that the good layers may be identified and mated to males out of good layers. In this way a progressive improvement can be

made in the average of the flock that will reach a high standard. The tramping of the breeders therefore is very important as they are going to produce the future layers.

DESIGNATING POULTRY STOCK.

The exact meaning of the terms used to designate young and old poultry stock are often confusing. According to an expert a pullet, strictly speaking, is a female under one year old. After she has attained her full maturity she is a hen, but in the trade a fowl is spoken of as a pullet until she has commenced her first year's laying. Therefore it is said to be correct to speak of her as pullet until she is

eighteen months old or has commenced to molt. A cockerel is a male bird under one year old, but is usually spoken of as a cockerel until he has at least entered well upon his first year as a breeding cockerel.

Cocks are older males, usually having passed through one season's breeding. A cockerel should never be used to breed from before he is a year old. A pullet if she begins to lay at six months may be bred from at nine months of age.

GREEN FOOD.

It is important that some kind of green food should be supplied when fowls are con-



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fined. Any food of this kind that is succulent will serve the purpose but one of the best is sprouted oats. To provide these, the poultryman should have a number of shallow boxes which have been provided with drainage holes. The oats should then be soaked 24 hours and spread in the boxes. They should be sprinkled night and morning and fed when the sprouts are two to three inches long. A block of sprouted oats six inches square is considered enough for 10 fowls.

Poultry Notes

The right ration and warm quarters will bring the eggs.

The dark and damp poultry house often brings the roup.

Poultry relish a little moistened food in addition to the fact that it helps increase egg production slightly.

To assist in keeping the poultry house free of mites sprinkle some ashes or air-slacked lime on the floors. To kill the lice, occasion-

ally take all the roosts down and wash with boiling soapsuds.

Odds and ends from the kitchen and green foods such as cabbage, alfalfa, silage and turnips will help increase egg production. The scraps from the kitchen, however, should be sorted, banana and orange peel and mouldy bread and cake are liable to produce bowel trouble.

Drinking utensils for fowls should be kept clean and in cold weather filled with warm water several times during the day.

You should keep your dusting box in the scratching shed and not in the roosting house. The dust will settle more quickly in the shed. Fine road dust is the best for the poultry house and it must be fine enough so that any insects on the fowls will be smothered.

Now is a good time to study up on the incubator question. Incubators pay well to those who know how to handle them properly, and any person who will give sufficient time and study can learn.

Feed and care are the two essentials to the successful handling of poultry in the winter. When looking after your fowls this is a good thing to remember.

Hen manure is one of the best of fertilizers for berries. An analysis shows that poultry manure contains 2.43 per cent phosphoric acid, 2.26 per cent potash and 3.85 per cent nitrogen as ammonia and organic matter.

O. A. C. Horticultural Notes

Although yellow Newtowns and Spitzengbergs seem to bear on alternate years, proper fertilization with tillage, irrigation and pruning, produced three successive crops in orchards used in farmer-O. A. C. cooperative trials. Continuation of these favorable conditions may bring these varieties into the annual bearing class, the college horticulturists hope.

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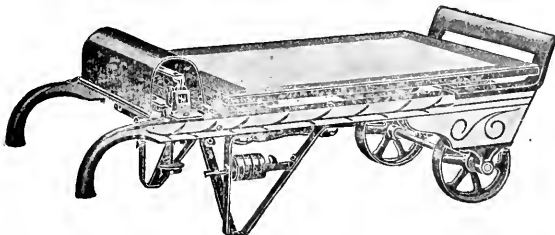
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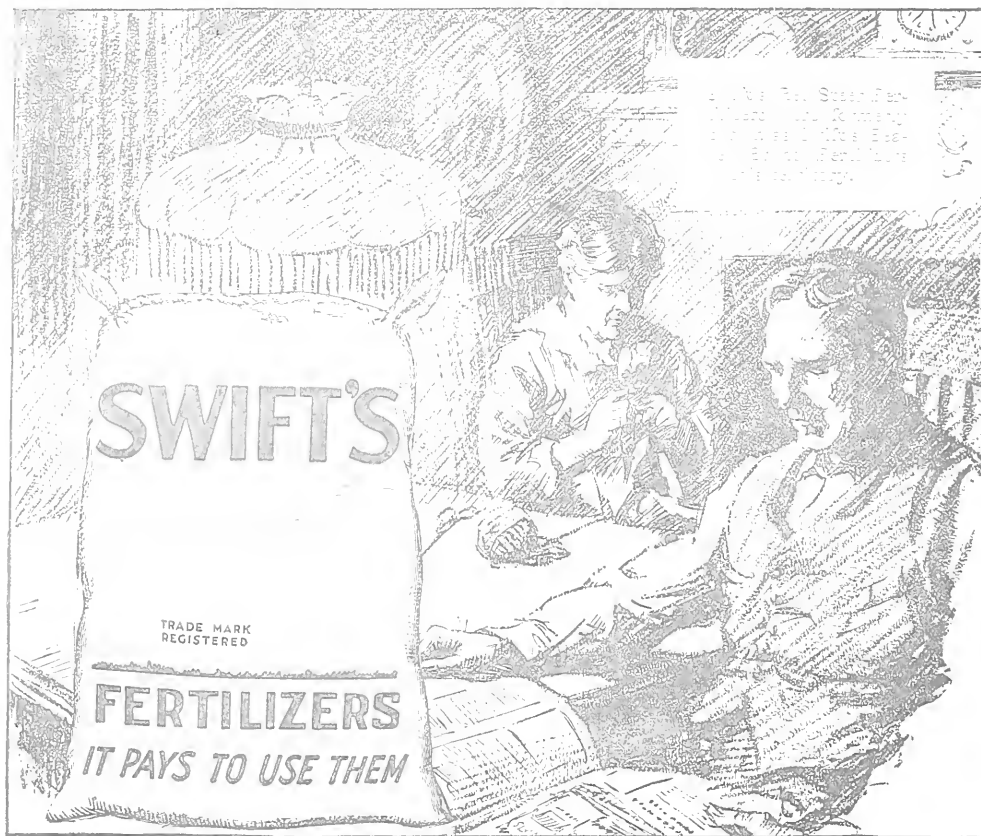
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VOLUME XV

FEBRUARY, 1921

NUMBER 8

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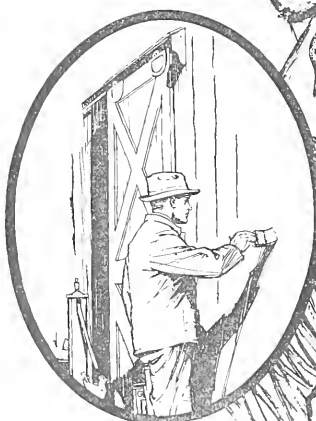
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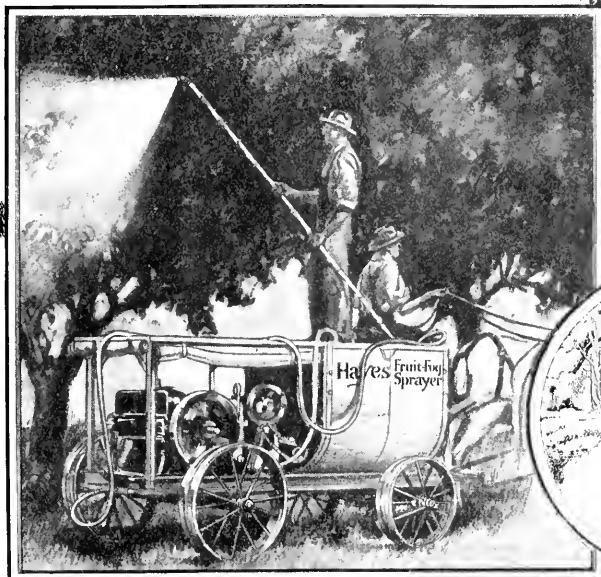
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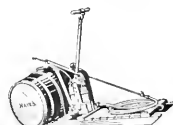
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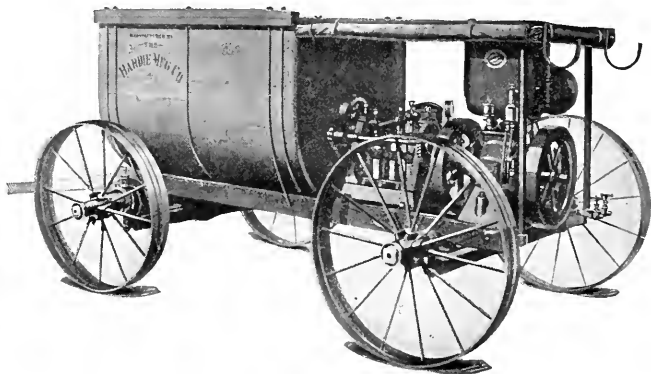
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NUMBER 8

Success in Spraying

By H. P. Barss, Plant Pathologist, Oregon Agricultural Experiment Station

SPRAYING success and spraying failure are often not far apart. Neighboring orchards frequently illustrate this fact but that is not the point this article desires to bring out. Rather it is the intention to point out that the secret of success in spraying depends on attention to certain things which, although apparently minor details, are after all the big essentials upon which the difference between success and failure depend.

The Pacific Northwest is famous for the perfection of its apples and pears, but this perfection is won only through the attention of the fruit growers to the details of careful spraying. It is safe to say that successful spraying has reached its highest standards in this section of the country but this has come only after years of hard experience in the fight against pests and diseases, and years of scientific experimentation on methods of control. The high degree of freedom from blemishes now reached by the fruit in some of our most famous orchard sections is the direct result of the intelligent application of a well-established spray program. There are however, many new orchard sections and many orchards just coming into bearing whose owners have not yet mastered the essentials of successful control and the years ahead will be years of discouragement for them unless they learn the importance of attention to details in the battle against the enemies of the fruit crop.

Spraying a Science.

Spraying is a science. That is, it has its foundation in a scientific knowledge of the pests and diseases to be controlled and of the way in which the spray materials in use affect these pests and diseases. One cannot be successful if one sprays "on general principles." Every single application has its particular reason for existence and the growers who spray successfully understand the whys, the whens and hows. It is not possible in a brief discussion like this to give a treatise on spraying but perhaps a few hints can be given that will help some to a better comprehension of the principles that underlie the spraying game.

Prevention Not Cure.

In fighting orchard troubles cure is not possible. Once the infection has occurred or the insect has entered or attacked the fruit no spray will heal the injury. Every effort of the orchardist must be directed toward prevention. The method of prevention to be employed will depend on the nature of the pest and its life history and method of dissemination. There are some pests that are controlled by direct application like San Jose scale, aphids, or to some extent powdery mildew. Others are controlled by covering the tree or its foliage and fruit with a material which acts as a protective poison. Such sprays are used in combating codling moth, apple and pear scab, apple tree anthracnose, etc. The important thing here is to get a coating over every particle of surface so that the baby worm, for example, has only a poisoned surface to browse on, or the fungous spore no point of attack that is not covered by the death-dealing chemical. By spraying we place a poison barrier between the parasite and its natural feeding ground.

Timeliness of Application Essential.

I once had a good friend who owned some apple trees but was not a commercial orchardist. He once complained that he was about to give up his attempts to spray for the control of scab. He had sprayed with the greatest thoroughness. He had used lime-sulphur. He had used it several times the common strength but without apparent results of any sort. I asked him when he had sprayed. He said, in March. Little wonder that he got no results! I told him briefly what the experienced orchard men know, that the disease spores arise from the old dead leaves on the ground but cannot attack dormant trees in winter and that no spray applied at that time could either kill the fungus on the ground or protect the foliage and fruit from attack when the spring came on. The next year he gave no dormant spray but just as soon as the cluster buds opened out and the small leaves separated far enough to expose the little cluster of undeveloped blossoms in the center he put on his first application to protect these parts as they unfolded against the air-borne scab spores. Just

before bloom, as the buds showed pink, he covered everything again to protect the leaves and flowers which had expanded much since the last application. Then, just as the petals dropped off, he sprayed everything again and repeated the work as required to protect newly developed foliage and fruit surfaces until the spring rains were past and the danger of further scab infection was practically over. This time he got his results and he knew the reason. Furthermore, I doubt whether he used much more concentrated lime-sulphur to make up all these applications than he had used the year before in the single useless spray. It was a knowledge of the way the disease worked and of how and when to protect the tree that meant success to him.

Foliage Must Be Covered.

I have seen orchards of apples run about 60 per cent culls on account of scab just because the owners hoped to control the disease by spraying the fruit alone. They had applied the sprays for the fruit at the right intervals, but scab had been permitted to develop on the leaves and these infected leaves had produced so many myriads of spores that there were probably dozens of spores for every tiny bit of fruit surface not actually covered by the spray and wholesale infections on the fruit resulted.

Tree Tops Often Neglected.

Many orchardists get a big surprise along toward late summer when the fruit begins to size and the weighted branches hang low. The early inspections showed little scab on the visible fruit but as the upper branches gradually sagged down and their load of apples came within range of the eye plenty of scab was in evidence. The reason was that the tops had been overlooked and undersprayed. One cannot expect satisfactory protection from scab or worms if the spray does not reach the tops as well as the lower portions of the trees. Many orchardists have not yet learned that their trees have reached a size where spraying from a tower is essential. It is admittedly difficult to know just how thoroughly one is covering the uppermost parts of a tree. There is one

great aid, however, of which the grower may make use. Its advantage is so great that a good many successful orchard men now employ it and more are adopting it every year.

Copperas (Iron Sulphate) Indicator.

This is the addition of copperas to the lime-sulphur spray which results in giving a black color to the solution. Without injuring the fungicidal value, this enables the spray operator to tell instantly exactly how well he is covering his tree and how fine the mist he is using. A half pound of copperas is taken for every gallon of concentrated liquid lime sulphur used in the tank or for every four pounds of dry lime sulphur put in. The required amount is dissolved in a little water and added to the tank. That is all. The foreman can check on the work of his crew without difficulty and the sprayer can see for himself.

Thoroughness All-important.

Spraying is not done for the chemical or medicinal effect on the tree. We use sprays that have as little effect on the tree as possible and as much effect on the pest. To be successful the spray must cover every susceptible surface completely. That is why high pressure and a fine mist spray are employed. In a finely divided condition the drops of spray are able to float like a mist through the tree and cover everything with tiny particles close together. With a coarse spray the large drops reach the fruit and foliage in big splatters leaving many good-sized unprotected spaces between which are open to attack. The recent introduction of the spray gun and high-powered engine have helped much to add to the speed of spraying and to the ease of operation but the successful use of the spray gun requires the development of considerable skill. The gun must be adjusted quickly from the broad cone mist for closer branches to the long drive for the upper reaches but with skillful handling the results are practically equal to those with the extension rod

and double angle nozzles. The gun, however, cannot be used with success on low-power or small-capacity outfits for the result is a coarse spray that does not permit of the thoroughness of application essential to good work.

Materials.

Success cannot be hoped for unless the right materials are used for the particular diseases and pests to be combated. There is no one spray that will do everything. Oil sprays, for instance, are valuable for certain insect pests but thus far have not proved useful for the control of fungous diseases. This fact should be remembered for in these days when much is being said about this class of spray materials growers are likely to be misled into expecting the impossible of them. For fungous diseases in general lime-sulphur is the proper material for spring sprays except on stone fruits where self-boiled lime-sulphur may be substituted. For autumn and winter protection Bordeaux is the most reliable material. New developments are taking place in the field of spray materials rapidly these days, but growers are wise who await the results of careful tests under conditions similar to their own before putting their trust in them. The Oregon Experiment Station and other experiment stations are performing this service of testing new sprays for the benefit of the fruit men and as soon as merit is demonstrated the facts are made known.

Particular Sprays for Particular Troubles.

Much time, labor and money have been in the past and still are wasted annually in sprays that do not get the results hoped for. This is particularly true of the so-called general clean-up spray given while the tree is dormant in the winter. The dormant spray has its uses. Peach leaf curl, for instance, cannot be controlled excepted by a dormant spray and this should be put on in most peach sections by the fore part of February if sure control is to be ob-

tained. For peach blight prevention, however, a spray must be applied as soon as the crop is off or infections will come with the fall rains. Apple and pear scab can be controlled only by spring sprays. Apple tree anthracnose demands a spray which will protect against fall infections and sprays given at other times cannot be expected to bring results. Similar statements may be made in reference to insect pests. A dormant spray will kill San Jose scale, but there are many of our most troublesome pests that cannot be reached except during the growing season. Successful control depends on a knowledge of such facts.

Cumulative Effects.

One of the most notable results of consistent, thorough spraying is the gradual reduction in the severity of most pests and diseases. This has been strikingly demonstrated in the Hood River Valley where the general adoption of standardized spraying programs and thoroughness of application has very measurably reduced the prevalence of apple scab under climatic conditions exceedingly favorable for this disease. Similar cumulative effects may be looked for wherever over a period of years close attention is given to the details of the spraying game.

Spraying Economy.

Successful sprayers have found out that economy in spraying is measured in the degree of prevention secured, not in the amount of spray saved. Thoroughness is essential and as much spray must be used as will give the most perfect protection. For the commercial orchardist the cutting down on the number of sprays necessary or the saving of spray on the trees has only resulted in immeasurably greater losses in the final pack than the value of the spray and labor saved. Profit comes from thorough spraying at the right time and with the right materials. This is the secret of spraying success.

Spray Guns and Their Operation

By T. J. Renner

MUCH has been said and written regarding the results obtained by using the spray gun, yet I have never seen a word written as to how to use one.

Mr. Black is very enthusiastic about the gun and reports excellent results. Mr. White says you could not hire him to use one in his orchard as they are no good. Why this difference of opinion? There are two reasons, either Mr. White did not have the same gun as Mr. Black or else he did not know how to operate it. Recently I met a man who was very emphatic about the gun being no good. I handed him another make of gun with a five-gallon disc in it and 200 pounds pressure on the sprayer behind it, and he soon changed his mind. Do not condemn all the guns because you could not get results with one. There are several makes of guns on the

market with large differences as far as results obtained and also as to ease of handling.

In regard to operating I will mention only the gun which has the largest sale and which when properly operated has given universal satisfaction. Pressure is the primary thing in getting results. The amount of pressure needed depends on the height of your trees; also as to whether the wind is blowing or not.

Numerous tests have been made at different pressures and it was found where the object to be sprayed does not exceed fifteen feet from the nozzle that 240 pounds gives you just as good a spray as 300 pounds does. In spraying greater distances than this 240 pounds does not break the spray fine enough to enter the calyx cups or to cover the largest amount of surface with a minimum amount of liquid. Therefore the

higher your trees are the more pressure is needed. The same is true when the wind is blowing and you have to stand further from the tree in order to avoid the spray blowing back on you.

In small trees or on the lower branches of large trees it is only necessary to open the gun a trifle which is accomplished by turning the handle to the left. As the distance from the nozzle to the place to be sprayed increases, gradually turn the handle more. Five-eighths of a full turn gives you the extreme range and should you not be able to reach the desired spot then increase your pressure. Be sure not to open the gun any more than is necessary to reach the part you want to cover and close the gun as the distance decreases. This is important. If you have a gun which does not permit this

Continued on page 26.

Pruning Young Peach Trees at Time of Planting

By C. L. Burkholder, Associate in Horticultural Extension, Purdue University

IT IS a common pruning practice to cut young peach trees to a whip 18 to 24 inches long at planting time. When the trees come from the nursery with green, spindling, poorly developed limbs at the point at which it is desired to start the head of the young tree, it is without doubt the best policy to cut to a whip. On the other hand if there is a nice head started at that point or even a little higher up it seems foolhardy to cut it off and grow on another at nearly the same place. Fig. 1 shows a young peach which has a fine set of scaffold limbs at about the right height when it came from the nursery. Three of these were selected for the head of the tree as shown in Fig. 2. These three limbs were cut back to stubs from three to four inches long.

Fig. 3 shows a tree which is best cut to a whip. The limbs are thin, green,

peramental Station found that the most numerous buds on a peach whip were first 36 to 42 inches above the ground followed in order by the 42 to 48 and the 0 to 6 inch spaces. His conclusions were that peach trees at the time of planting should be pruned somewhat according to the grade and character of the stock and not according to some definite height regardless of all other factors.



FIGURE 1. A tree like this should not be cut to a whip. The scaffold limbs are already nicely started.

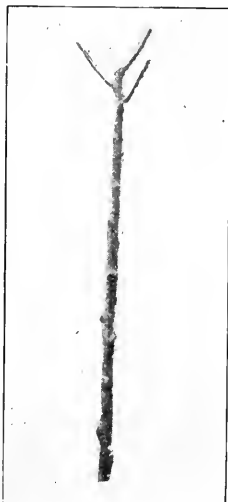


FIGURE 2. The tree in Figure 1 after pruning.

and sappy on the lower part of the tree where the scaffold should be started. When a peach tree is pruned to a whip at planting time, it often happens that three or four limbs start on one side of the tree, making a very poor head. In other cases the whip dies down nearly to the ground and sprouts up from near the bud. This risk is avoided when a scaffold can be picked from the limbs on the tree as it comes from the nursery.

Some very successful growers start the heads of their young trees six inches above the ground. This makes a low head and produces the largest number of branches 40 to 50 inches in length the first season but it does not seem to make a noticeably stronger scaffold. It is much more difficult to cultivate up close to a tree headed only six inches high than it is one headed 24 or 30 inches high. Many growers are training their trees higher than formerly as they are finding that they can keep the top of the tree plenty low and at the same time are able to disk up close to this type of tree.

It does not seem advisable to cut all peach whips to the same height at planting. It will be found on observation that there are very definite areas on the peach whip where the buds are much better developed. By cutting just above such an area of buds the chances are much greater that a satisfactory head will be formed the first season. Another factor having a bearing on the height at which peach whips should be cut is the diameter of the trees. If small stocks, below $\frac{5}{8}$ inch, they will make a more satisfactory growth the first year if cut back more severely than trees of the larger grades.

M. A. Blake of the New Jersey Ex-



FIGURE 3. A type of peach tree which should always be pruned to a whip.

An exportable surplus of 100,000 boxes of apples in New Zealand is the estimate of the minister of agriculture of the dominion. With 37,000 acres of commercial orchards coming into bearing, new outlets will have to be found for the surplus.

Orchard Spray Program for 1921

By H. P. Barss and A. L. Lovett

THERE are two objects in spraying. One is to coat all parts of the tree or fruit so thoroughly that no fungus or insect can find any spot that is not protected by a layer of poison. The other is to destroy the pests or parasites present by hitting them with the proper kind of poison at a stage when they are defenseless against it. Spraying is a preventive. It cannot cure damage already done.

Spraying cannot be effective unless adapted to the life-habits of the parasite and the condition of the tree and fruit. Yet many growers apply sprays uselessly at times when little real good can be done and then fail to spray at the critical periods when they could get results. Other growers fail to do the work thoroughly enough to reach all insects, or to coat all susceptible parts of the tree. Still others use wrong materials. Success can be expected only from the thorough application of the right sprays at the right time.

General Hints.

Care of the Young Orchard: If free from disease and insect pests when planted, young orchards seldom require any regular schedule of sprays. Thorough inspections should be made, however, at frequent intervals. All kinds of fruits should be watched for the invasion of San Jose scale or other scale insects, aphids, borers, bud weevils, fruit caterpillars and Armillaria root rot. In apple orchards look also for mildew, anthracnose, fire blight, and woolly aphid; in pears, for fire blight, slug, and blister mite; in peaches, for leaf curl, mildew, blight, and twig miner; in prunes and plums, for leaf spit, spider mite, bark beetles and borers; in cherries, for bacterial gummosis, leaf spot, slug, and shot-hole borer. When any of these troubles are found, follow out the recommendations outlined for them in the regular spray schedule.

Pruning: Pruning should be conducted in such a way as to let light and air into the interior of the tree. This favors rapid evaporation of moisture from leaf and fruit, and thus tends materially to hinder fungous infections. While pruning, inspect the trees for San Jose scale, woolly aphid, and other pests and diseases. Remove all mummied fruits from the orchard. Where bacterial gummosis or fire blight is present always sterilize pruning instruments and cuts with some good disinfectant to prevent spreading the disease.

Spray Outfit and Nozzle: An adequate outfit is necessary for best results. In power spraying a pressure of 175 to 225 pounds is advisable with red and nozzle equipment. The angle nozzle of the disc type, using a disc with a small opening, gives general satisfaction. This delivers the fine, misty spray desired and affords ease of manipulation in applying the spray from different directions. Two of these noz-

zles on a Y at the end of a rod, by delivering more solution, increase the speed and thoroughness of application.

Use a Tower: In spraying larger trees satisfactory control of insects and diseases in the upper third of the trees is next to impossible without the use of a tower.

Advantages of the Spray Gun: The new "Spray Gun" type of nozzle has met with general favor. This is a very compact outfit, easy to manipulate and delivering a large quantity of liquid. Powerful pressure is essential for the proper functioning of a spray gun, a force of 250 to 300 pounds being advisable. Engine troubles commonly develop, with the use of the gun, from speeding up the engine where the power and capacity are insufficient to maintain a reserve when in action. The spray gun does its best work on the highest powered outfits. With such an outfit in the hands of a careful manipulator, spray may not only be applied practically as well as with the extension rods, but much more rapidly and with less fatigue.

Lime-Sulphur Injury: Lime-sulphur should not, as a rule, be applied after early June, in apple orchards, because of the burning that often results when hot, bright weather prevails. Self-boiled lime-sulphur is recommended as a substitute under conditions where ordinary lime-sulphur is liable to injure. Even as dilute as 1 to 45 lime-sulphur may cause injury in warm weather to prune fruit and foliage and it is unsafe to use on peach foliage at any time.

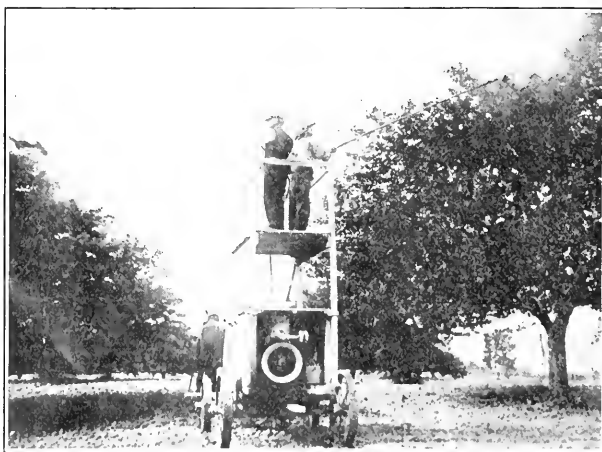
Local Variations: Climate has a tremendous influence on the severity of insect and fungous attack and on the time when the attacks occur. Hence the marked variations in climate from season to season and the difference in temperature, rainfall, etc., in different sections of the state will naturally

make some modifications in the time of application and number of sprays required to obtain best results. The recommendations in this article are adapted most closely to the average conditions prevailing in the large fruit growing areas from the Cascades west and from the Valley of the Umpqua north. To the east and south, where rainfall is less abundant, fungous diseases will, in general, be less severe and will require fewer fungicidal sprays for control. This favorable circumstance need not be true of insect pests and their control. Some fruit sections are so fortunate as to have the services of a trained specialist familiar with the diseases and insect pests and with local conditions. Growers so favored, should by all means obtain the available, consult the college.

Pointers on Spray Materials.

Many varieties of commercial spray materials are on the market, some of them for general use, many of them for special purposes. Most of these materials are very good when properly used; some are of questionable value when price and purpose are considered, and a few are really dangerous. As a rule the commercial preparations of the various spray materials recommended in this article are standardized, are more convenient to use, and often as cheap as the home-made sprays when the labor and equipment necessary for home preparation are considered. It is important that the material, if a commercial product, be pure and fresh. It should be in the original unopened container and should not have been allowed to dry out or to freeze.

Lime-Sulphur: Wherever the word "lime-sulphur" is used in this article it refers to the ordinary commercial concentrated lime-sulphur solution, testing approximately 32 degrees Baumé. The



Applying Spray from Horse-Drawn Rig.



Applying the Spray from Gasoline-Propelled Truck.

expressions "lime-sulphur 1 to 8, 1 to 30," etc., mean one gallon of this commercial lime-sulphur added to 8 gallons or to 30 gallons of water, etc. When the lime-sulphur is made at home it should always be tested with a hydrometer, and dilutions made according to the tables which are printed herewith. It should be remembered, however, that thoroughness of application is always more important than minute exactness of dilution.

STANDARD LIME-SULPHUR DILUTION TABLE.

Showing in columns 1, 2, 3 and 4 the number of gallons of water required for each gallon of concentrated solution to obtain the desired strength.

Hydrometer Test of Stock Solution Baume Scale	1	2	3	4
	Dormant Spray (1-8) Gallons	Early Spring Spray (1-30) Gallons	Mid Spring Spray (1-40) Gallons	Late Spring Spray (1-50) Gallons
34°	1.304	8½	32	13
32°	1.282	8	30	12
30°	1.260	7½	28	11
28°	1.239	6½	25½	10
26°	1.218	6	23½	9
24°	1.198	5½	21½	8½
22°	1.179	4½	19½	8
20°	1.160	4	17½	7

SIMPLIFIED LIME-SULPHUR DILUTION TABLE.

To make 50 gallons of dilute spray use the quantity of concentrated lime-sulphur indicated in columns 1, 2, 3 and 4 for the different strengths, and dilute with water to 50 gallons.

Hydrometer Test of Stock Solution Baume Scale	1	2	3	4
	Dormant Spray (1-8) Gallons	Early Spring Spray (1-30) Gallons	Mid Spring Spray (1-40) Gallons	Late Spring Spray (1-50) Gallons
34°	1.304	5	1½	1
32°	1.282	5½	1½*	1*
30°	1.260	6	1½	1*
28°	1.239	6½	1½*	1½*
26°	1.218	7	1½	1½
24°	1.198	8	2½	1½
22°	1.179	9	2½	1½
20°	1.160	10	2½*	1½*

* Means use a little over measure.

† Means use scant measure.

Dry Lime-Sulphur: Several firms are now putting on the market preparations of lime-sulphur in dry form. These are convenient to use and appear not to be more injurious to foliage or fruit than the ordinary lime-sulphur. Unfortunately the experiment station has thus far been unable to make satisfactory comparative tests between these dry forms and the liquid material as far as control of diseases or insect pests is concerned. At present, therefore, no statement as to relative effectiveness can be made except that from analyses by the department of chemistry it appears that it will take about four pounds of the dry lime-sulphur to be equal in

fungicidal or insecticidal strength to one gallon of the average commercial liquid lime-sulphur.

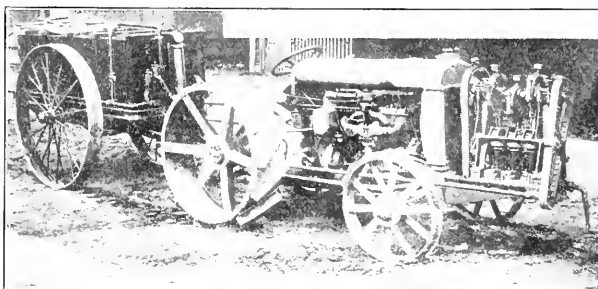
An Aid to Thoroughness: Iron Sulphate (Copperas): This material, dissolved in water and added to the spray tank at the rate of half a pound of iron sulphate to each gallon of concentrated lime-sulphur used, will turn the solution black without impairing its value. This black color is a valuable indicator for the man who is spraying, enabling him to determine exactly how well he is covering the tree.

Arsenate of Lead: Arsenate of lead is prepared in paste form and as a powder. Both are effective in the control of insects. Recent investigations indicate that unless one is near the

using the paste arsenate, double the amount here recommended.

Two types of lead arsenate occur, known respectively as the basic lead arsenate (neutral arsenate) or triplumbic, and the lead hydrogen arsenate (acid arsenate) or diplumbic. The neutral arsenate of lead is a more stable compound and is safer to use on tender foliage or in combination sprays where there is a tendency to burn. The acid arsenate has much to render it superior for most poison spray work and is considered safe in combination with lime-sulphur on apples and pears. Commercial lead arsenates are generally the acid forms unless otherwise branded.

Arsenate of Lime: Arsenate of lime or calcium arsenate has recently appeared as a commercial substitute for the lead arsenates. The value of this material lies in the reduced cost and higher poison content pound for pound. Methods for manufacturing the calcium arsenates have not, thus far, been standardized; brands therefore vary greatly in their chemical and physical properties. The calcium arsenates are less stable than the lead arsenate. This lack of stability increases the possibility of burn and makes necessary the addition of some material as a stabilizer. For this purpose, excess lime is generally added to the spray solutions. Summarizing our present knowledge of calcium arsenate as a commercial orchard spray, we may state that, with an excess of lime present in the solution, the material is safe and highly efficient as a spray. Probably there is, at present, no adequate reason for a wholesale

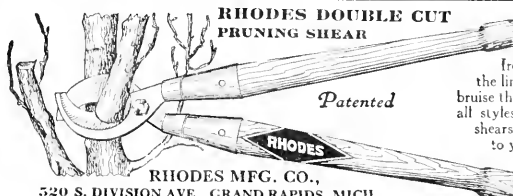


Spraying Outfit Hauled by and Powered from Tractor.

place of manufacture, thus insuring that the paste be freshly made, the powdered arsenates are probably advisable. The proportions recommended in this article are figured on the basis of the powdered form. For example, "lead arsenate 3-200" means powdered lead arsenate three pounds to 200 gallons of the dilute spray solution. In

abandonment of lead arsenate in favor of calcium arsenate. Growers contemplating the use of calcium arsenate in the orchard are advised to submit samples to the Oregon Experiment Station for analysis and consequent instructions on the exact procedure in preparing the solution.

Nicotine: Nicotine as recommended



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in this article refers to the concentrated nicotine sulphate, 40 per cent solution. A strength of 1 to 1200, which is equal to one pint in 150 gallons, is sufficiently strong for most troubles; frequently higher dilutions are possible. Soap or lime-sulphur improves the spreading and killing powers of the nicotine solution.

Oil Sprays: The use of oil emulsions for the dormant spray has not been generally recommended or practiced in Oregon. For certain insect troubles they are superior to other sprays, and they are probably of equal value with lime-sulphur as a dormant insecticide for scale, red spider, mite, etc. Limited observations indicate that an occasional application of oil spray has a beneficial effect in softening and smoothing the bark and producing a generally stimulating effect on the tree. The action of an oil spray is comparatively slow and where rain follows within six or eight days after the application, the effectiveness is materially decreased. Particular care should be taken, therefore, to apply the oil during settled weather.

Spreaders are substances to be added to the spray solution which improve the effectiveness by increasing the wetting and covering powers of the spray as well as the adhesiveness, thus affording a greater protection for a longer time. It is our conviction that most of our standard sprays will be materially improved by the use of spreaders. Their use is particularly advised in the summer applications of arsenate for the codling moth.

Unsafe Combinations: The combinations recommended in this article are safe under ordinary conditions. Regarding combinations not referred to here, consult the Oregon Agricultural College.

The Dusting Method.

The possibility of applying fungicides and insecticides in a dust form has recently attracted much attention. The advantages are rapidity of application, the saving in labor, and the very light outfit required. There is also no water supply problem or need of hauling heavy loads of liquid. The cost of material is, however, much greater than for liquid sprays. A great disadvantage also seems to be that effective work is impossible where even a slight breeze is blowing. Furthermore, there have been found no dust materials effective for the control of scale, aphids, apple-tree anthracnose, peach-leaf curl, and some other troubles. Unless later developments overcome these disadvantages, therefore, the dusting outfit must be considered only as a supplement to the regular spray outfit, and not a practical substitution for it under Oregon conditions.

With very few exceptions, the regular spray program as recommended for the control of apple scale and codling moth should be followed in the bearing orchard. Frequent orchard inspections should be made, and where other pests and diseases are found, the proper applications for their control should be given.

SPRAY PROGRAM FOR APPLES AND PEARS

Application	Time Applied	Pest or Disease and Materials to Use
1. Dormant Spray.	As the winter buds are swelling and before they open.	For San Jose Scale, Red Spider Mite, Blister Mite: (Use lime-sulphur 1-8 or miscible oil 1-17. For Leaf Roller*: Use miscible oil 1-17.
2. Delayed Dormant Spray.	Pears: Cluster bud scales separating. Apples: Young leaves separated just enough to expose blossom buds.	For Scab and Mildew*: Use lime-sulphur 1-30. For Aphids: Add nicotine 1-1200. For Bud Moth: Add arsenate of lead 4-200.
3. Pink or Pre-blossom Spray.	When the blossom buds are well separated in the cluster, just before opening.	For Scab and Mildew: Lime-sulphur 1-40. For Bud Moth, Leaf Roller, Pear Fruit Worm: Add arsenate of lead 4-200.
4. Calyx Spray.	Just as the last petals are falling and before the calyx closes on main bud of each cluster.	For Scab and Mildew: Lime-sulphur 1-40. For Codling Moth (topes only): Add arsenate of lead 3-200.
5. Ten-day Spray.	Ten days or two weeks after the calyx application.	For Scab and Mildew: Use lime-sulphur 1-40 or 1-50 (or self-boiled lime-sulphur 8-8-50, if burning is feared). For Pear Slug: Add lead arsenate 3-200.
6. Thirty-day Spray.	Four or five weeks after the calyx application.	For Scab and Mildew*: Use lime-sulphur 1-50 (or self-boiled lime-sulphur 8-8-50, to prevent burning). For Codling Moth*: Add arsenate of lead 3-200. For Green and Woolly Aphids: Use nicotine 1-1200.
7. July Spray.	July 10 to 25, depending on locality and season.	For Codling Moth*: (second generation): Use arsenate of lead 3-200.
8. August Spray.	August 5 to September 5, depending on locality and season.	For Codling Moth*: Use arsenate of lead 4.5-200. For Anthracnose: Add Bordeaux mixture 4-4-50.
9. Fall Spray.	Late October, or immediately after fruit is picked.	For Anthracnose: Use Bordeaux 6-6-50, or lime-sulphur 1-8. For Pear Leaf Blister Mite* and Scale: Use lime-sulphur 1-8.

SPRAY PROGRAM FOR PRUNES AND PLUMS

1. Dormant Spray.	Just as the winter buds are opening.	For San Jose Scale, Red Spider Mites, Twig Miner: Use lime-sulphur 1-8.
2. Pre-blossom Spray.	When the blossom buds are showing white, just before opening.	For Brown Rot* Blossom Blight: Use Bordeaux 4-4-50, or lime-sulphur 1-30. For Bud Moth: Add lead arsenate 2-100. For Aphids: Add nicotine 1-1200.
3. First Fruit Spray.	As soon as the "shucks" or calyx parts are off the fruit.	For Brown Rot and Leaf Spot*: Use Bordeaux 4-4-50, or self-boiled lime-sulphur 8-8-50, with spreader. For Symetia: Add neutral or triplumbic lead arsenate paste 7-100.
4. June Spray.	About June 1.	For Leaf Spot (beneficial for Brown Rot also): Use Bordeaux 4-4-50, or self-boiled lime-sulphur 8-8-50, with spreader.
5. July Spray.	About July 1.	For Leaf Spot (beneficial for Brown Rot also): Use same materials as in preceding.
6. August Spray.	About one month before picking time.	For Brown Rot*: Use Bordeaux 4-4-50, or self-boiled lime-sulphur 8-8-50; add spreader.

SPRAY PROGRAM FOR PEACHES

1. Leaf Curl Spray.	From December to mid-February.	For Peach Leaf Curl*: Use Bordeaux 6-6-50.
2. Late Dormant Spray.	Just as the first buds are ready to open.	For Peach Twig Miner, San Jose Scale, Red Spider Mite: Use lime-sulphur 1-8. (If scale is absent dilute 1-12.) For Aphids: Add nicotine 1-1200. For Bud Moth: Add lead arsenate 2-100.
3. First Fruit Spray.	Just after the "shucks" or calyx parts fall off.	For Peach Blight* on fruit and leaves: Use self-boiled lime-sulphur 8-8-50. (Many growers use Bordeaux 4-4-50 with good results.) For Peach Blight on fruit and leaves: Use self-boiled lime-sulphur 8-8-50.
4. Second Fruit Spray.	About two or three weeks after the preceding.	For Brown Rot: Use self-boiled lime-sulphur 8-8-50.
5. Last Fruit Spray.	About one month before picking.	For Bud Moth and Peach Twig Miner: Add lead arsenate 2-100.
6. Early Fall Spray.	As soon as the fruit is picked.	For Peach Blight, twig and bud infections: Use Bordeaux 4-4-50.
7. Late Fall Spray.	About the first of November.	For Peach Blight, twig and bud infections: Use Bordeaux 6-6-50.

SPRAY PROGRAM FOR CHERRIES

1. Dormant Spray.	Just as the winter buds are beginning to open.	For San Jose Scale and Red Spider Mite: Use lime-sulphur 1-8. For Aphids: Add nicotine 1-1200 and apply Tanglefoot in band around trunk to prevent ants carrying aphids up the tree.
2. Pre-blossom Spray.	When blossom buds show white, just before they open.	For Brown Rot Blossom Blight*: Use Bordeaux 4-4-50, or lime-sulphur 1-30, with spreader. For Bud Moth and Symetia: Add neutral or triplumbic lead arsenate paste 7-100.
3. First Fruit Spray.	As soon as most of the "shucks" or calyx parts have fallen.	For Leaf Spot* and Brown Rot: Use Bordeaux 4-4-50, or lime-sulphur 1-50, or self-boiled lime-sulphur 8-8-50. For Symetia: Add neutral or triplumbic lead arsenate paste 7-100.
4. Second Fruit Spray.	Apply a month before picking time.	For Brown Rot and Leaf Spot: Use Bordeaux 4-4-50, or self-boiled lime-sulphur 8-8-50. For Slugs: Add neutral or triplumbic lead arsenate paste 7-100.
5. July Spray.	After the fruit is picked or about first of July.	For Leaf Spot*: Use Bordeaux 4-4-50, or self-boiled lime-sulphur 8-8-50.
6. August Spray.	About the first week in August.	For Cherry Slugs and Bud Moth: Use lead arsenate 2-100.

* When a pest or disease is marked with a star (*) see special discussions regarding it.

† Spraying for San Jose scale and red spiders may be deferred until the Delayed Dormant (No. 2) if the strength of lime-sulphur in No. 2 is increased to 1-3.

Diseases of Apples and Pears.

Apple Scab: Dormant sprays are of no value against scab. In Western Oregon with the more susceptible varieties the delayed dormant spray (No. 2) must be given as the first scab spray to prevent early infections. At least four scab sprays are required to insure a clean crop where rains continue into June.

Lime-sulphur will burn through scab spots which are already present on the leaves, and not infrequently also will cause a slight edging and tip burn of healthy leaves; but this is unavoidable. Periods of hot weather, however, are conducive to fruit burn and to more severe foliage injury. At such times the use of self-boiled lime-sulphur is suggested.

Pear Scab: This disease, which is similar to apple scab, is controlled in the same way. At least two thorough sprays before blossoming must be given to catch early infections. Some varieties, however, are extremely susceptible to lime-sulphur injury and very weak dilutions of this material are suggested. In fact, on the sorts most liable to spray injury, the use of self-boiled lime-sulphur beginning with the calyx spray would be advisable. The addition of a spreader to this material will greatly increase its covering power.

Fire Blight: While scab may destroy an entire crop, fire blight may destroy the entire orchard. It is the most dangerous of all known diseases of the apple and pear, and must be watched for unceasingly.

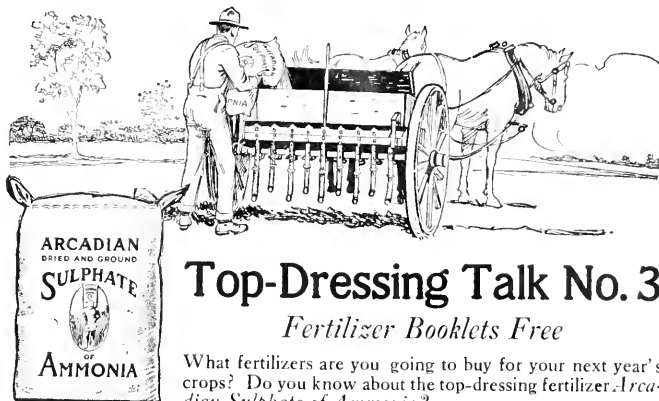
In cases of suspected fire blight, send specimens at once to the Agricultural Experiment Station at Corvallis for microscopic examination, and get in touch with your county fruit inspector or Farm Bureau agent. Do not attempt to cut out blight until you have received careful directions from a reliable source. It is highly contagious and may easily be spread by persons who do not understand the disinfecting process.

Do not be duped into using so-called blight cures. Many orchards have been ruined because owners have unwisely put their trust in some reputed "expert" or in some alleged "remedy" backed up by fine testimonials.

Apple Tree Anthracnose: Infections on fruit and branches start in the fall during the rainy spells. To clean up a badly attacked orchard an application of weak Bordeaux mixture should be given in August or early September, followed by winter strength Bordeaux immediately after picking time. When well under control, a single thorough spraying just after picking season will often be sufficient to keep the disease within bounds.

Powdery Mildew of Apples: Prune out all affected tips before spring. The ordinary sprays for the control of scab when given according to schedule will keep the mildew down to a practically negligible amount. The special iron sulphide mixture formerly advised is probably not of great advantage under Oregon conditions.

Moss: Moss is rarely troublesome where a regular spray schedule is main-



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tained in the orchard. To clean up an old moss-covered orchard add common soda lye to the dormant spray or spray straight lye dissolved in water at the rate of one pound to five or six gallons. Such strong caustic, however, should be used with caution. Bordeaux mixture and winter strength lime-sulphur are also of value.

Drouth Spot, Cork and Bitter Pit or Baldwin Spot of Apples: These are physiological troubles not caused by parasite organisms and hence not controllable by spraying.

Diseases of Stone Fruits.

Brown Rot of Stone Fruits: This is the worst disease of prunes in Oregon, frequently destructive to cherries, and sometimes bad on peaches. It varies tremendously in severity from year to year. It often causes considerable damage in prunes and cherries by blossom

blight. Attacks of fruit rot are likely to develop at any time during the season when there is continued moisture, particularly when accompanied by warm temperatures. A rigid spray schedule, therefore, cannot be adhered to. The worst attacks occur almost always during the ripening and picking period. Hence it is usually very desirable to give a thorough spraying about a month before picking. Other sprays should be given when conditions seem to justify them.

Leaf Spot or Yellow-Leaf Disease of Prunes and Cherries: Caused by a fungus known in its summer stage as *Cylindrosporium*. Results in dropping of leaves. This, if severe, brings about poor fruit development, retarded growth, and reduced or weakened fruit buds. Spraying will materially lessen the disease. Attacks vary greatly in severity from year to year. Hence growers are ad-

vised to watch and spray when first signs of the disease are evident.

Internal Browning and Gum Spot of Prune Fruit: These are physiological troubles and not controlled by sprays. Often mistaken for brown rot and insect attack.

Peach Blight: Infections take place abundantly during fall rains and cause the death of buds and the girdling of twigs during the winter. Then in the spring new infections attack fruit and foliage, causing fruit spot and leaf shot-hole. The first fall spray should be given before rains begin.

Peach Leaf Curl: Infections take place just as the leaves are emerging. The one spray needed must be applied before any of the leaf tips are out. Every bud and twig must be thoroughly covered. Leaf curl may be controlled by a winter application even as early as the first of December. Bordeaux gives more uniform success than lime-sulphur in controlling the disease.

Powdery Mildew of Peaches: The first control applications should be given soon after the winter buds have come out and while the leaves are still very small; repeat at intervals of three or four weeks until mildew is eliminated and give another spray if it begins to show again. Use self-boiled lime-sulphur 8-8-50 with spreader added. In warm weather dusting with very finely powdered dusting sulphur should be effective.

Bacterial Gummosis: This disease is common and destructive on young sweet cherries, and sometimes troublesome on other stone fruits in Western Oregon, but is apparently unknown east of the Cascades. It cannot be controlled by spraying.

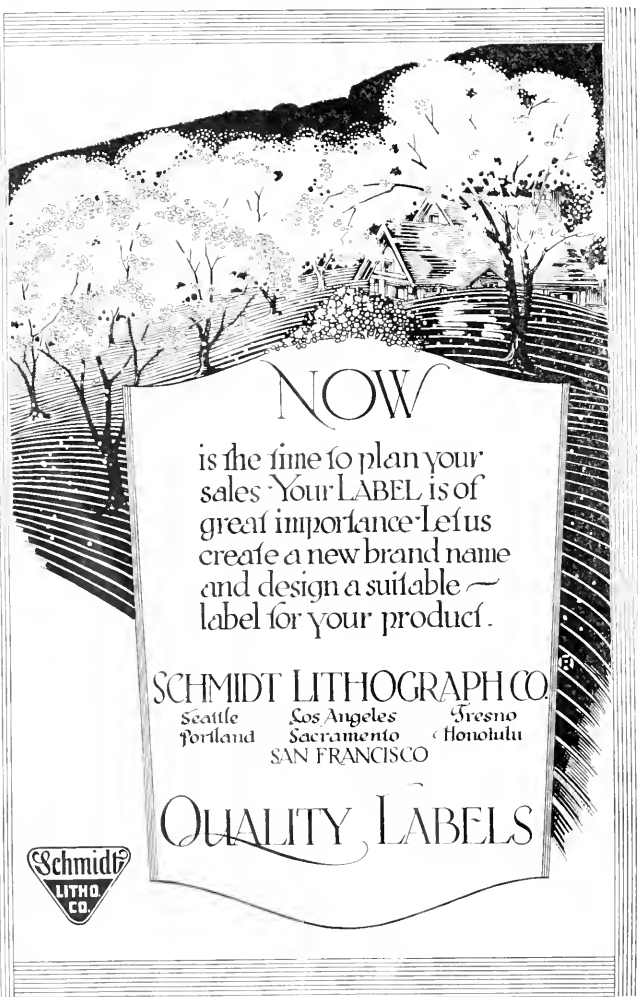
Insect Pests.

San Jose Scale: This manifests itself as small, ash-gray or blackish, pimple-like scales clustered on the bark. Removing scale discloses a flattened, oily, lemon-yellow insect beneath. The bark is thin, and stained with purple, the trees becoming bark-bound and devitalized. Infested fruit shows bright red spots.

The ideal time to spray is during February. To avoid an extra application, may be put on earlier, or deferred to the delayed dormant. Use lime-sulphur 1-8. Application for control is advisable only when one is reasonably sure of presence of pest. Thoroughness is essential: drive the spray under the buds. Oil emulsions are effective, and are probably occasionally advisable as a substitute for lime-sulphur because of their beneficial effect on the tree.

Red Spider Mites: Use Spray No. 1 (or No. 2 on apple, pear and peach). Application is advisable only when one is reasonably sure of presence of pest.

Codling Moth: Use Sprays No. 4, 6, 7, and 8. The exact date for the application of Sprays No. 6, 7, and 8 will vary with the season and with the locality. In the case of No. 6 the date of application should correspond with the first deposition of eggs. Procure a standard thermometer and take daily readings at 8:00 p. m. during the season immediately following the calyx application.




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When the evening temperature registers 60 degrees or above, it is time to apply this spray. As a general rule, this date will follow the calyx spray by about three and one-half to four and one-half weeks in Eastern and Southern Oregon; four to five weeks in the Hood River Valley, and five to six weeks in the Willamette Valley. In a bearing orchard, it is never advisable to omit this spray.

Generally speaking, our most serious codling moth injury occurs in late summer resulting in the costly "September sting." To assist in minimizing this injury it seems advisable to increase the poison dosage by one-half in the last summer application, using 4.5-200 in spray 8. The element of time of application is of first importance and will vary greatly with the season, locality, and local conditions. Where possible, if in doubt, consult the fruit inspector, county agent, or some official who is in a position to know when to apply these summer sprays. In Southern Oregon the rule is, "Keep the fruit covered with spray."

Aphids or Plant Lice: Nicotine sulphate, 40 per cent, added to Spray No. 2, at the rate of two-thirds pint to 100 gallons of the dilute spray, is the standard application for control of plant lice. As aphids are nearly always present in the orchard, this application is generally advisable. Reinfestation of apples may take place in June, in which case, add nicotine to Spray No. 6. In the case of cherry trees ants carry aphids up to reinfest the trees. Band the trees with Tanglefoot or other material to prevent this.

Bud Moth: This is a chocolate-brown worm one-third inch long, found in a mass of webbed leaves at tip of twig. On apple and pear add lead arsenate 4-200 to Sprays No. 2 and 3. On stone

fruits add neutral lead arsenate 7-100 to Spray No. 2. Application is advisable only where pest has done injury the past season.

Pear and Cherry Slugs: These are greenish-brown, slimy, slug-like larvae, which skeletonize foliage of cherry and pear. On pear use Spray No. 5, adding lead arsenate 4-200. On cherry use Spray No. 4, adding neutral arsenate of lead, 6-100. Road dust, air-slaked lime, sulphur, or any finely divided powder applied as a dust is also very effective.

Blister Mite: This is usually serious only on pears. Use Spray No. 1, and be very thorough in applying it. The sprayed trees should appear as if white-washed. The ideal control for blister mite is a spray applied in the fall (see Spray No. 9). When thoroughly done, one application in three years is generally sufficient for satisfactory control.

Leaf Rollers (on apple): Most common in Northern and Eastern Oregon. Use miscible oil emulsion recommended in Spray No. 1. For maximum efficiency, apply during period of settled weather. Application is advisable only where one is reasonably sure of presence of pest.

Fruit Worms (on pear): Serious in Valley. Use Spray No. 3. Lead arsenate in the pink.

Woolly Apple Aphis: This pest occurs as clumps or masses of cotton-like patches about wounds, cracks, and galled areas of bark, or on water sprouts and exposed rootlets. Beneath this cottony mass are wriggling colonies of soft brown aphids. When thoroughly established, this is a very serious pest in apple trees. Mark infested trees for special treatment.

Borers: They are not controlled by sprays, but require special treatment.

Fruit Tree Leaf Syneta: This is a small, elongate, active, creamy-white beetle. Feeds on buds, unfolding leaves, blossom petals, and developing fruit, making unsightly holes. Use the neutral arsenate of lead, 7-100, in sprays as indicated.

Cherry Fruit Maggot: This is a small, white cylindrical maggot found feeding inside the fruit. If lead arsenate sprays are applied for the control of cherry slug, they will also ordinarily control the maggot. If it is desired to apply a special spray, use lead arsenate, 3-50, plus 2 gallons of cheap syrup. This should be applied at the rate of one pint to the tree. Use a hand pump throwing a fine misty spray which will deposit minute droplets on the outer leaves. This is to poison the fly which produces the maggot. Treat the trees just as the fruit begins to color well.

Peach and Prune Twig Miner: A common and serious pest of prune and peach. Occurs as a chocolate-brown worm one-quarter inch in length found in tunnels at the base of a wilted tip or fruit spur. Worms also tunnel into young fruit, causing it to drop. Summer applications are ineffective. Use

spray indicated. Applications are generally advisable as the pest is usually present.

More complete information on particular pests and diseases, and also directions for making any particular spray material, may be secured by writing to the Oregon Agricultural College at Corvallis. If information is desired regarding the identity of any insect or disease, send complete description, together with specimens of disease and of the affected plants, if possible. Wrap the material in a container which will not be crushed in the mails. Put your name and address on the package.



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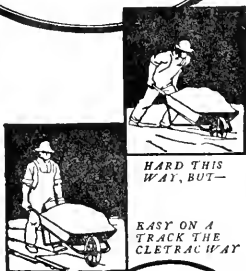
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"Pedigreed" Trees—Where Do We Stand?

By A. E. Murneek, Assistant Professor of Horticultural Research, Oregon Experiment Station

WHILE we have been fast eliminating the scrub or unproductive cow from our dairy herds, and in its place have been introducing the selected or pedigreed animal, very little, if any, selection work of systematic and organized nature has been done with our fruit trees, the exclusive mortgage lifters of many a farmer of the Northwest. If there is a marked difference in respect to productivity among the Holssteins; if a Jersey is not always a Jersey; if "blood" counts; can there not possibly be also as real fundamental and tangible difference between two Newtown trees, though the buds from which they were propagated may have come from the same orchard. If "blood" counts in the Jersey, may it not count in the Spitzenburg as well? This analogy may not be permissible exactly, but it conveys the meaning just the same.

Undoubtedly there have been numerous, though largely spurious, attempts at selection of fruit trees. Most of them have, however, not justified the measures of precaution and necessary expenditure connected with such a practice. Perhaps the lack of a ready and convenient method of judging the exact commercial value of a selected tree—a "Babcock tester" for plants, so to speak—has been the main cause of these failures. Yet the waves of enthusiasm for "pedigreed" trees visit us

often enough. They are within the easy memory of the horticulturist of today. Just now one such wave is reaching us from our sister state in the south.

Recently much interest and great activity has been displayed by citrus growers in California in propagating "selected" trees and grafting over unproductive trees or whole orchards to "selected" buds obtained from trees of known performance. These are the direct results of long continuous and laborious investigations of A. D. Shamel, of the United States Department of Agriculture, who, with the help of several assistants, has been working on this problem ever since 1909. The results of this endeavor have been embodied in a number of bulky bulletins published by the federal government. They are quite striking and illustrative, to say the least.

The records of Mr. Shamel show that great variability exists within the commercial varieties of almost all cultivated citrus fruits. Thus, for instance, thirteen important strains have been found in the Washington naval orange alone, while the total number of strains existing in this variety, though unknown, may exceed many times this number. Some of these strains have been named and are now used almost exclusively for propagating purposes. Others have been found to be worthless. Tree performance records have shown

that many drone trees of low productivity are to be found in almost every citrus orchard, some having as many as 75 per cent of such trees.

As a result of these investigations most of the citrus fruits propagated in California at present are from buds of selected trees, which have been found either by continuous observation or by tree performance records to be productive and of the desirable type or strain. This practice has become so established that even such dominating and conservative organization as the California Fruit Growers' Exchange has established a special department of bud selection. According to the last annual report of the general manager of the Exchange, this department has furnished to date approximately 1,000,000 buds cut from selected trees, and will increase this number by 250,000 during the present season. Consequently almost all of the leading nurserymen in the state are now propagating their citrus nursery stock only from selected buds.

Moreover, it is estimated that more than 40,000 undesirable citrus trees in California orchards have been top-grafted with selected buds. Some of these top-worked trees are already in bearing. According to Mr. Shamel not a single case has been found where the chosen tree characteristics have not

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been established by means of this practice.

The results obtained in California are given here at length not only due to their conspicuous character, but also because of their economic importance. Here we witness the first really good example where bud selection of fruit trees apparently has become a decided success.

Thus it is clearly seen that generally speaking, there is something, perhaps a whole lot, in bud selection. The citrus varieties are famous, however, for their great variability. Here then one would be tempted to stop and insist that though bud selection may be of profound practical value in the case of citrus trees, it would hardly be worth while to think of bud selection or "pedigreed" stock of deciduous trees. The

apples, pears and stone fruits are conspicuous for their great stability.

Notwithstanding the many arguments that have been advanced pro and con on the subject of bud selection of deciduous trees, it has not yet been settled. There are many fruit growers of life-long experience and wide reputation who are firm believers in this prac-

tice. Thus George T. Powell, a well known fruit grower of New York, in a paper recently read before a convention of California nurserymen, relates his valuable experiences with bud selection extending for more than 30 years. It is the firm belief of Mr. Powell that buds for propagating purposes should be chosen from trees or

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parts of trees of known type, vigor and productivity. Scores of such opinions may be obtained from other growers of like experience. There are many horticulturists, to be sure, who are taking the opposite side and declaim the idea. The many and extensive investigations conducted by several agricultural experiment stations in the United States and Canada are of particular significance in this respect. With but a few exceptions they have given invariably negative results.

In view of the present widespread interests among fruit growers of the Northwest in setting out new orchards

and the current activities of the California growers respecting "selected" buds, it seems to be timely that the question of pedigreed or selected trees should be given a careful consideration. It may be well then to ask where we stand on this question. What information has been precipitated by horticulturists and plant breeders regarding the value and practicability of bud selection of horticultural plants and particularly so of deciduous fruit trees? How much is there in it anyway?

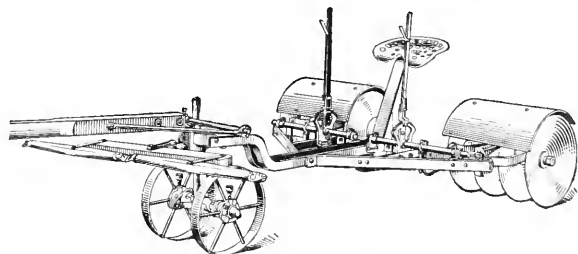
The subject leads us straight to the consideration of the nature and frequency of bud variations. It is of com-

mon knowledge that no two trees are exactly alike in an orchard, as no two buds or fruits are the same on a tree. Modifications or variations in nature are the rule, not the exception. This is true with all plants and parts thereof. It is due primarily to the instability, change, and hence continuous difference in both the internal and external environment of the plant. Most of these modifications are, however, so small that they are of no particular significance to the fruitgrower. In fact they are a blessing to all of us, for what dreadful monotony would there be if plants of a certain kind or variety and their fruits would be exactly alike.

Sometimes, however, variations of this type are of such a degree that they may be very striking and quite valuable to the fruit grower. The exact causes and reasons of such cumulative and expressive variations are not known, all one can tell is that they are the results of impressive and striking changes of the environment. In literature, such variations are referred to as "discontinuous variations," "somatic variations," or less pretentious terms are used, such as "fluctuating variations," or simply "modifications" or "fluctuations." Technically of course more or less clear cut differences could be drawn regarding the proper use of these terms, for our purposes, however, it looks as if the last two terms would be as good as any and would convey the proper meaning. Hence, because of their general instability, we shall call variations of this type fluctuations or modifications.

Fluctuations may be exhibited by any part of the plant, stem, branches, leaves, buds, blossoms, fruits, etc. They may appear in various forms. The fruit may be larger or smaller in size, or may exhibit a modification in form, color, or time of maturity. The eating or keeping quality may have changed. Then, of course, the tree itself or part of it may be so modified that it will bear prolific crops or remain unproductive. Recently it has been shown that because of fluctuating variations, trees may be changed from a condition of self-fertility to that of self-sterility and vice-versa. These are but a few illustrations.

Concluded in next issue.



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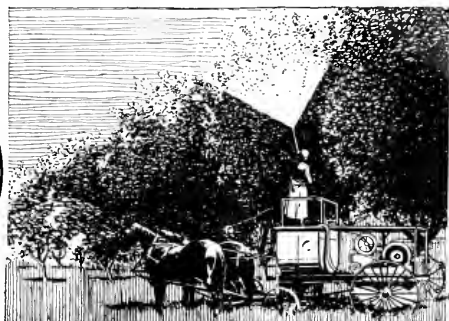
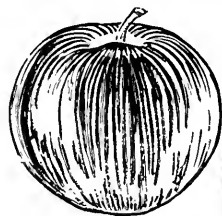
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is a powerful control of insects but safe to use freely and thoroughly without fear of damage to blossom, foliage or fruit. It contains 30% to 33% arsenic oxide and less than $\frac{1}{2}$ of one per cent water soluble arsenic. This is both the safest and strongest formula on the market.

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Founder of Oregon Horticultural Society Dies.

Ezra Leonard Smith, born in Vermont in 1837, died at Hood River, Oregon, January 22, 1921, in his eighty-fourth year.

While a student at Lombard University, Galesburg, Illinois, Mr. Smith attended the Republican Convention in Chicago, in 1860, when Abraham Lincoln was first nominated for the presidency.

He came to California in 1861 and interested himself in mining, later going to Washington Territory, of which he became Secretary in 1867. Mr. Smith was associated with the group of men who established the first bank in Olympia.

March 1, 1876, with his family, he arrived in Hood River. He early became interested in fruit growing and planted one of the Valley's first commercial orchards. Through his love for fruit trees, Mr. Smith, affectionately known among his friends as "Hood River" Smith, quite naturally became a leader of the men engaged in their culture. He was one of the founders and for several years president of the Oregon Horticultural Society and during the years of his long and useful residence in Hood River, was an enthusiastic leader in the local fruit industry.

Care of Your Assets.

In the home of the country dweller, infinitely more than in the city, the wife is an asset and not a liability! In view of the multitudinous duties devolving upon her, surely she deserves much consideration.

The fruit grower who, year after year, is forced to get along the best he can with inadequate equipment—doing by hand what he should have a machine to do, working early and late under heavy handicaps—will not remain in the industry long. Under such conditions he will dispose of his place, at a loss if necessary, and seek some other less arduous and more hopeful employment.

The average fruit grower's wife could not sell her place, nor could she give it away if she wanted to, but she is loyal enough and true enough not to want to. Yet, how often is she forced to do by hand what she should have a machine to do? Running water in the kitchen, at least; electric power, what a vista that opens to the imagination—

easier wash days, brighter light in the evening by which to sew, and a dozen little helps in the day's work. Does anyone but the wife herself know what it means to get along without these things? (Her helpmeet should know.) She is a practical asset!

Upon her should be bestowed at least as much consideration and attention as he gives to the equipment for orchard operations, and in return she will give to the home health and contentment.

Adequate Fruit Inspection Imperative.

Every shipper and grower should stand solidly back of any move to improve fruit inspection. It is only the perfect fruit which has won for the Northwest and the Pacific Slope its world-wide reputation. The grower who is not "for" rigid inspection and enforcement of grade and pack regulations is a menace to the fruit industry of the territory. It is unfair that one careless shipper in a community should jeopardize the returns of every grower whose fruit happens to be shipped in the same car.

The Pacific Northwest, through its progressive methods of handling its enormous fruit tonnage, has attracted

IMPORTANT NOTICE TO SUBSCRIBERS

Effective January 1st, 1921, the subscription price of "Better Fruit" was reduced to \$1.00 a year, and subscribers who have renewed recently at the old rate of \$2.00 a year will be extended in accordance with postal regulations.

the attention of practically every fruit producing country in the world. They are copying the great American Northwest, buying the same orchard and packing house equipment, adopting the same rules of pack and grade, and, having learned all we can teach them, are entering the lists against their teacher.

Surely this is no time to let down the bars.

Hope in the Freight Rate Situation.

Growers and shippers of fruit may well be encouraged by the current discussions of existing freight rates. The subject has been thoroughly aired at every convention or other gathering of men who are interested in fruit production or transportation and there are many evidences that the railways themselves are becoming alarmed at the effects of the existing rates and will use every means within their power to readjust them before another shipping season.

The current rates, which went into effect last September, are approximately 25 per cent higher than the rates which existed before that time and in the brief period since the new tariffs became effective, it has been demonstrated that in many cases they absorb all the profits from fruit shipments and leave the grower with a net loss on his year's operations.

There can be only one result of the continuation of these tariffs and that is decreased production and shipment, with resultant loss in profits to land owners, growers and railways alike, and market scarcities which will be both inconvenient and disastrous.

When the freight increases were allowed, the one thought which seemed to be uppermost in the minds of the tariff makers was that the railroads must be given a chance to make more money. There is little indication that the new tariffs were scientifically formed or that the tariff makers gave any thought to the ultimate effect upon such industries as fruit growing. Back of the increased rate is the unholy control which the railway labor organizations have over the railroads. While wages and other lines of industry are gradually being adjusted to meet reduced prices, the railroads are tied up by government fiat to a schedule of wages and operating regulations which make it extremely difficult for the railroads single-handed to reduce rates.

There is reason to believe, however, that when the public understands the situation, public opinion will be a powerful factor in bringing about the establishment of tariffs which will be fair to railways, labor and industry, alike.

Did you tackle the trouble that came your way

With a resolute heart and cheerful;
Or hid your face from the light of day
With a craven soul and fearful?

Oh, a trouble's a ton, or a trouble's an ounce,
Or a trouble is what you make it;
And it isn't the fact that you're hurt that counts.

But only how you take it.—Anon.

What Papers Interested in Fruit Are Saying

ORDER PACKAGES EARLY.

If the fruit growers want a guaranteed supply of baskets next year, they should give their order early to the manufacturer—this month or next—and permit the manufacturers to deliver a certain percentage of the baskets direct to the fruit growers' barns or railway station as early as he wishes. This advice from the pen of Mr. J. M. Wallace, president of the Oakville Wire-bound Box and Basket Co., Ltd., in a recent issue of the Toronto Globe, is sound business. While the manufacturer does not expect payment until the following October, he wants orders in early so that he may run his plant throughout the year, instead of the usual procedure of closing down for a number of months during fall and winter. The Clarkson Fruit Growers' Association, which buys supplies of all kinds for 172 members, has placed an order for about 42,000 crates and 125,000 berry boxes for delivery at any time direct to the members' barns. A far-sighted policy of that kind will be well repaid when the next fruit rush is on. Other associations and individual growers might well follow the example, and order now.—*The Canadian Horticulturist*.

ACTION NEEDED IN FREIGHT SITUATION.

Column after column of news and comment from the trade concerning the freight rate situation and its effect upon the fruit and vegetable industry have been pointed in *The Packer* during the last few weeks. Distribution of food is being curtailed, production threatens to be checked materially another season, freight tonnage is being reduced and something must be done at once to relieve all factors in the perishable food industry.

The railroads are not going to lower their rates unless they can be shown that the present freight costs will reduce their income by curtailing the volume of traffic. Once the heads of the railroad companies are convinced of this fact, they will voluntarily go to the Interstate Commerce Commission and

ask for authority to put lower rates into effect at once. The problem before the growers, shippers and distributors, then, is to show the railroads wherein their present attitude concerning freight rates is having the effect of reducing the shipments of perishable freight.

The trade, acting as a unit from all parts of the United States, ought to ask a conference with the responsible railway executives, and armed with facts and figures, show the carriers just what harm the high freight rates are doing to the fruit and vegetable industry and the resultant loss to the railroads in decreased tonnage. Every state in the Union should be represented in this conference, and it should be called soon enough to all new rates which might be agreed upon to be put into effect before another crop season arrives. —The Packer.

During the months of October, November and December, 98 permits were issued by State Engineer Percy A. Copper, covering the appropriation of water from various streams and other sources for the irrigation of 28,398 acres of land, the development of 180 horsepower, domestic, mining, fluming lumber, and various other purposes, at an estimated cost of approximately \$100,000. Seven reservoir permits have been issued, covering the storage of 3,714 acre feet of water.

Among the more important projects contemplated for irrigation development are the Fort Klamath Meadows Company, of Fort Klamath, Oregon, for the irrigation of 9,318 acres of land in Klamath County, with the waters of Four Mile Creek, Seven Mile Creek, and Anna Slough; A. M. Geary of Portland for the irrigation of 7,100 acres of land in Klamath County, with the waters of Upper Klamath Lake, and the Mt. Reuben Mining Company of Grants Pass, Oregon, covering the appropriation of water from Reuben Creek for development of 87 horsepower at an estimated cost of \$10,000.—Medford Sun.

That the eastern barrel crop is now practically off the market and that there is a better outlook for the western box apple is the opinion expressed recently by Harry Lassen, traveling representative of the Bean Sprayer interests. Mr. Lassen, whose business takes him into the various apple growing centers throughout the world, has just arrived from the East, where he devoted close study to the conditions there. He stated that western growers of the later varieties, especially Newtowns, are justified in being optimistic concerning the future, for, with the barrel crop now off the market, there will be an increasing demand for the boxed variety, which, he thinks, will begin to show an upward movement immediately.

While there has not been any great demand in the home market for western fruit, prices have shown a slight improvement over those prevailing two weeks ago.

The English market is rapidly improving, and with the sharp rise in exchange and the cutting of the freight rate on Atlantic steamers, there are indications that next month will bring better returns. Latest quotations from England show the following prices for boxed apples, extra fancy, \$2.99, C. grade \$2.61 to \$2.80; Oregon Newtowns from \$3.92 to \$4.67 per box; Spitzenbergs, \$2.99 to \$3.36. Last week for the first time this season, the box shipments were heavier than those of the barrel variety.—Hood River News.

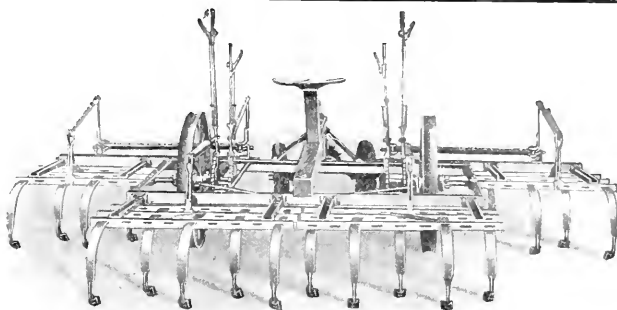
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Twenty thousand discriminating families last year secured stock of us. This year our business is better than ever. "There's a reason," and that is the class of stock we deliver and the service we render.

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I have choice trees of the
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They are of my own grow-
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PRUNES, LOGANBERRIES
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Grandfather1850
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Buy your trees from those who know how.

Modern Methods of Codling Moth Control

W. H. Wicks, Director Bureau of Plant Industry, State Department of Agriculture, Boise, Idaho

IN THE Idaho horticultural law as passed by the fifteenth session Idaho legislature, 1919, we find the following:

Section 2077. Spraying for codling moth. "All apple and pear trees of bearing age within the State of Idaho infested or known to be infested at any previous season with codling moth shall be sprayed at least two times each season with arsenate of lead solution or its equivalent, first spraying to be made within thirty days after the first appearance of the blossoms on the tree, second spraying within thirty days from time of first spraying."

As a result of the most recent and thorough experiments in addition to the successful practices of successful growers and the experience of the inspectors of the Bureau of Plant Industry, State

Department of Agriculture, this section is recommended for revision to the sixteenth session of the legislature as follows:

"All apple and pear trees of bearing age within the state of Idaho infested or known to be infested the previous season with codling moth shall be sprayed at least two times each season with arsenate of lead solution or its equivalent, first spraying to be made when petals have fallen and before the calyx closes, and the second application to be given on the date and in the manner specified by the Department of Agriculture."

Spraying for codling moth is therefore necessary in complying with the horticultural law of the state.

Extent of Apple and Pear Industry.

In connection with the enforcement of this law it is interesting to note the extent of the apple and pear industry as shown by an inventory taken of the fruit situation by inspectors in 1920. From a card index record of all orchards in the state there are 26,759 acres devoted to apples and 284 acres in pears. This represents the commercial acreage that must be sprayed for codling moth as well as isolated pear and apple trees throughout the state.

In 1919 as estimated by the Federal Bureau of Crop Estimates, Bureau of Markets, State Department of Agriculture, State Horticultural Society and railroad officials, the apple crop amounted to 4,000 cars divided into districts as follows:

	Cars
Payette-Weiser District.....	250
Boise Valley District.....	500
Twin Falls District.....	400
Lewiston District.....	350
Emmett Valley.....	115
Coeur d'Alene-Moscow District.....	114
Other Districts.....	21
Pears	6

For 1920 the Department of Agriculture figures our apple crop at 4,875 cars, pears 10 cars.

Horticultural Inspection Districts.

Until 1920 the state was divided into 16 districts which was based on the geographical formation and the location of the fruit industry in each which was designed to facilitate the inspection service. In 1920 the state was divided into inspection districts based upon the car-load production of commercial fruit. It is now divided according to the following districts with an inspector in charge of each district:

Boundary County District.
Bonner County District.
Kootenai County District.
Latah County District.
NezPerce-Lewis-Clearwater County District.
Jonahann-Crystal District.
Payette-Crystal District.
Washoe Bench-Payette District.
Fruitland District.
Council District.
Boise-Beatty District.
Perkins District.
Meridian-Eagle Heights District.
Nampa District.
Middleton-Homedale-Caldwell District.
Parna-Apple Valley-Roswell District.
New Plymouth District.
Emmett Valley District.
Twin Falls-Filer-Buhl District.
Idaho Falls District.
Blackfoot District.
Pocatello District.

Detailed Plans of Codling Moth Control.

The conditions during 1919 were extremely favorable for the congenial development for fruit pests, particularly codling moth, San Jose scale and red spider, and due to much lack of interest on the part of many growers in caring for their orchards the loss from worms and scale for this year as proven by the cull pile at harvest time was estimated at 25 per cent average state loss of the apple crop, 15 per cent being due to worms and 10 per cent being due to scale. By redividing the state, strengthening the inspection service under the reorganized Department of Agriculture and a concerted effort on the part of the growers to reduce the culls due to codling moth and scale to the lowest possible amount in 1920 the following plan was inaugurated and carried out:

Codling Moth Control Based Upon a Study of Its Life History and Activities.

"You have been sent 20 pieces of mosquito netting for the purpose of making an inverted cone around 20 trees for the purpose of trapping the emerging adult codling moth. These trees should be selected in various parts of your district which will represent the various elevations and environments which you believe will influence the activity of the codling moth. These cones should be placed on the trees just as soon as the calyx spray is given. Cut out the center of the cloth to fit the size of the tree trunk, tie this tightly around the tree trunk with a strong cord so the moth cannot escape between the bark and the cloth, placing the cloth about 2 feet up the trunk. Spread

out the bottom of the cloth in a circular manner as far from the tree trunk as possible. Peg it down first with small sticks and then cover the edges firmly with dirt which will prevent the wind from blowing up the edge of the cloth. This will make an inverted cone. The essential thing is to pick out locations and trees where you have the greatest chance of trapping a number of emerging moths. These will be coming from under rough bark on the trunk and rubbish on the ground near the base of the tree. Watch these cones from day to day for the emergence of adult moths which you will see fluttering under the cloth. The insect control poster which you have distributed in your district gives the details of how the traps and burlap bands are used.

"When the first moths appear advise

Your 1921 Fruit Tonnage

When planning the handling of your fruit tonnage this year, we recommend that you consider the merits of independent marketing.

Prior to the advent of Produce Reporter Organization independent marketing was fraught with grave risks, but since the advent of the "Blue Book" you can ship to distant points with impunity.

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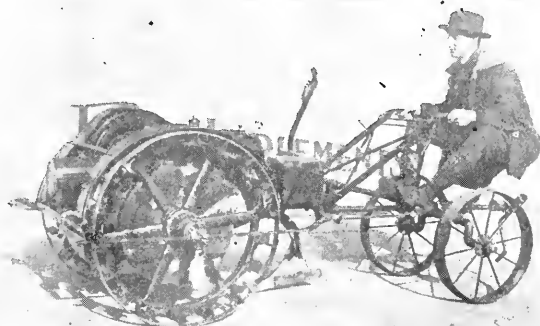
through the papers of your district that the second spray, or sometimes spoken of as the first cover spray, should be given two weeks from the date the moths begin to emerge. Be sure that your specimens are representatives of the sections of your district and from your study of the traps give the date for the entire district.

"To date the third spraying, put 30 to 40 burlap bands around the tree trunks, watch for worms two or three weeks after the second spraying and date the third application 25 days after the first worms are caught. These bands

should be put on the trees immediately after you put on the cones, but put the bands on separate trees. By having the bands and cones in the same orchard it will be handy for you to take care of both on the same trip. Cut the burlap in strips 12 inches wide and long enough to go around the tree. Fold over 4 inches which will permit an 8-inch flap to hang down the tree. Tie tightly so the worms will crawl down over the burlap and up under the same for protection and pupating. These bands should be about 2 feet from the ground.

"It will be necessary in order to name the spray dates most accurately for you to observe the cones daily in order to determine the date when the first moths are seen under the netting. Refer to the bulletins, from the University of Idaho, Utah and Pullman, Washington, which have been sent you, in regard to the life history of the codling moth."

The district under the supervision of an inspector is sufficiently small that close supervision of details is possible pertaining to each orchard in his district. The inspectors were authorized to work among the growers, lending all possible aid in securing spray material, urging repair of spray machinery and better equipment if necessary and

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FOR THE ORCHARD

Takes place of team; costs less to operate.

Biggest small tractor, smallest big tractor made.

Only \$460 f.o.b. Portland. 5 H.P., weight 1100, height 36 inches, width 36 inches, turning radius 6 feet.

AGENTS WANTED. Write for particulars.

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Orchard Ladders

LIGHTEST AND MOST DURABLE.

SUCCESS

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LAST LONGER. GIVE BETTER SATISFACTION.

It Pays to Buy the Best

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Free Spray Calendar Tells When to Spray-What to Use

The Dow Spray Chart is the result of years of experiment and research. It tells how to care for apples, cherries, plums, grapes, currants, gooseberries, peaches and other fruits—explains insect enemies and diseases of potato, tomato, cabbage and vine crops. Directs the mixture of all spray materials, tells the proper time for spraying and how to apply each particular spray. You should not be without this Calendar if you grow fruit of any kind. We will gladly send it free. Quality brings the high price and quality is not possible without spraying. Write for this free chart today.

Dow Powdered Lead Arsenate

Extremely light and fluffy—Dow Powdered Lead Arsenate possesses many advantages over the heavier and more granular varieties. It mixes so readily and remains so well in suspension that it entirely covers foliage with a milky, filmy coating. Because it reaches and covers every part of foliage and branch—because it sticks where it touches and because of its high content of arsenic, it has a deadly effect on all forms of foliage eating pests. Dow Powdered Lead Arsenate is a great economy and a great convenience. Managers of large orchards and directors of state stations have used this product for years and now purchase in carload lots.

Packed in $\frac{1}{2}$, 1, 5, 10, 25, 50, 100 and 200-pound containers. Sold through our dealers or direct where we are not represented.

Ask for folder describing all Dow Spray Materials. The folder includes Dow Powdered Lead Arsenate, Dow Powdered Lime-Sulphur, Dow Lime-Sulphur Solution, Dow Paste Lead Arsenate, Dow Powdered Calcium Arsenate, Dow Powdered Borax, Dow Powdered Bordo-Arsenate. These are the finest spray materials known for the control of vegetable and orchard pests, and are used by the world's leading orchardists and state departments in carload lots. Send coupon below for our free Spray Calendar.

THE DOW CHEMICAL CO.
MIDLAND, MICHIGAN, U. S. A.

Trade



SEND FREE SPRAY CHART TO

Send
This 

in assisting wherever possible for the production of better fruit.

All neglected orchards or plants which were known to be a source of public nuisance were sprayed by the owner, the state or cut down. Cooperation in this matter was given by fruit growers desiring to grow good fruit to stimulate interest in this pest control campaign. Five thousand copies of an insect control poster were distributed in stores, depots and other public places and given to fruit growers who desired a copy of the same. In addition to giving the life history of the codling moth, San Jose scale, peach twig borer and red spider, this poster gave information in regard to insecticides and a time of applying them for each one of these pests. Throughout

the pest control campaign three outstanding facts were constantly kept before the mind of the growers. These facts are: (1) proper spray material; (2) proper time of application; (3) thorough work in applying.

The Bureau of Plant Industry has frequently been informed by insecticide dealers and dealers handling spray equipment that they sold more spray material and more modern spray equipment during 1920 than any previous year. The prospective high prices for fruit and a determined effort on the part of the fruit growers to reduce the loss by worms to the minimum were factors which brought splendid cooperative action in this matter in connection with the newly organized pest control work.

Test of Spray Material.

Practically all of the standard makes of arsenate of lead were used and tested. All proved good.

During the spraying season of 1920, inspectors of this bureau endeavored to make an official Baumé test of the concentrated lime-sulphur solution which was used in their district and also a test of the spray material in the spray tank of commercial sprayers and growers. In all 534 tests were made. The records show that the lime-sulphur as it came from the factory average 33° Baumé and the average test in the spray tank was 5° Baumé. When a commercial sprayer or grower was found with a less degree he was immediately urged to increase the strength. This met with ready response. Chemical analysis of lime-sulphur solution were made by the state chemist in cooperation with this bureau and practically all samples show satisfactory analysis.

Results.

The records of the inspectors of this bureau show that in orchards properly sprayed at the right time less than 1 per cent worm damage, ranging as high as 60 per cent in orchards improperly sprayed and cared for. A detailed statement is given in the following table:

District	Per Cent Scale	Per Cent Worms	Per Cent Bruise Under- size	Per Cent Frost	Per Cent Loss All Causes
Perkins	2	10	7	1	19
Beatty	2	5	7	1	14
Ichleberger	5	5	10	20	20
Ustick	10	10	7	27	37
Wood Station	10	10	10	30	35
Manville Station	10	10	15	33	38
Yost	3	10	10	23	23
Bissell	2	5	7	14	11
Meridian	2	3	6	11	11
Onweiler	2	3	7	12	12
McElroy	10	5	10	25	25
Victor Station	10	5	8	23	23
McDermott	4	2	3	9	9
Noble	1	2	1	4	4
Somma	1	2	9	12	12
Ten Mile	1	2	15	18	18
Kuna	7	5	20	32	32
Sandpoint	0	1	\$20	21	21
Council	0	5	3	8	8
Bonnars Ferry	10	12	\$20	32	32
Coeur d'Alene	0	2	6	8	8
Moscow	0	10-100	3	28	28
Lewiston	5	10	\$50	65	65
New Plymouth	1	20	4	25	25
Payette	1	6	** 4	11	11
Parma	1-	11	2	14	14
Emmett	1	4	†† 5	10	10
Grangeville	7	3	†† 5	25	25
Twin Falls	0	30	5	35	35
Blackfoot	0	10	4	14	14
	3.6	7.5	9.8	20.7	

* Oyster Shell; † Codling Moth; ‡ Average 25%; § Scab; * Hail; ** Frost; †† Bruise 2; †† Hail 3, Frost 2.

For 1920 the loss due to worms for the entire state shows an average of 7.5 per cent with an additional loss also of 3.6 per cent due to scale. Thus it is seen that the worm loss was reduced 50 per cent over the previous year and the scale loss considerably more. It should be borne in mind that these figures represent the average and that many conscientious fruit growers had practically no loss due to worms or scale.

The pest control campaign for 1921 is planned on a similar basis and by earnest cooperation on the part of all fruit growers the damage from worms and scale for the state is expected to be materially reduced over the results of 1920.

USE Nitrate of Soda (CHILIAN) WHY?

BECAUSE, it is a plant food increasing the vigor of your orchards.

BECAUSE, its application is recommended by all government authorities and experiment stations in the Northwest.

BECAUSE, it is the cheapest source of nitrogen so essential to plant life.

The early application is productive of best results.

For literature and quotations write or wire:

The Nitrate Agencies Co.

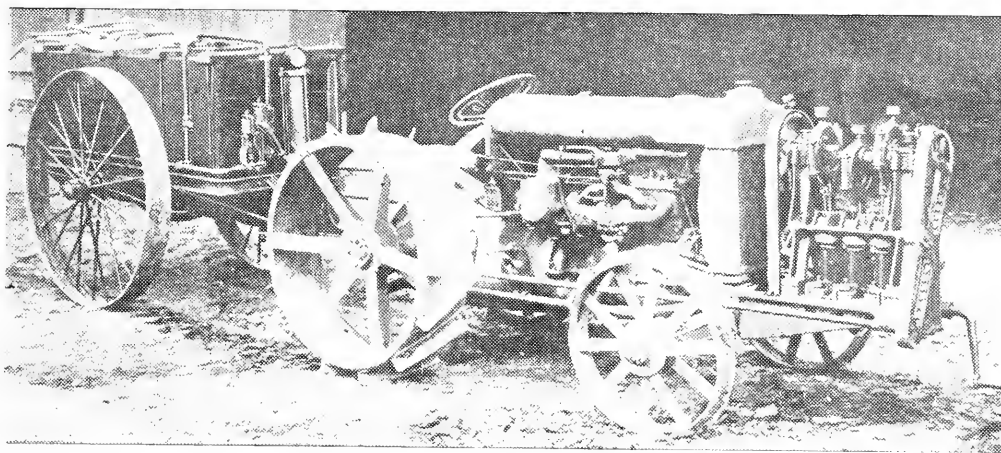
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This marks progress of the best sort, combining perfect

Efficiency with Economy

In one hour the sprayer can be detached, and your tractor is ready for other use. The 300-gallon tank and the return trips made three times as fast as with horses, saves much time in refilling.

It will pay you, Mr. Grower, to write us for full particulars or see your nearest Fordson dealer.

E. A. Mitchel Tractor Co.

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Western Montana

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Branch, 151 South Post St., Spokane, Wash.

READ WHAT ONE BIG GROWER SAYS:

RICHEY & GILBERT CO.
YAKIMA VALLEY FRUIT
PRODUCE

Yakima, Wash., October 5, 1920.

Fred Chandler Inc.,
Yakima, Wash.

Dear Sirs:

The Fordson Super-Bean Sprayer which we have used in our apple orchards through the summer of 1920 has given satisfactory service. It has been used 360 hours, putting on six sprayings. The pressure and volume of liquid thrown has been anything we desired. The ability of the outfit to get about among the apple laden trees without knocking off the fruit has been greater than any horse-drawn outfit.

Between sprayings the spray outfit has been removed from the Fordson so that the tractor could be used for disking. Since the tractor can thus serve a double purpose, we believe a combination such as the Fordson Super-Bean Sprayer will prove dependable and we will make additions to our spraying equipment along that line.

Yours truly,
H. M. GILBERT.

Spray Guns and Their Operation

Continued from page 4.

perfect control of the liquid, you had better get one that will or go back to rods and nozzles.

If you could follow a minute particle of spray from the gun nozzle you would find that it would go forward in a spiral direction. When it reaches the point where the air resistance is equal to the pressure behind it there will be a sort of roll and it will float in the air. Every cubic inch of air space will be full of this finely atomized liquid which will thoroughly cover either the fruit or the limbs. This can be accomplished only by a high pressure depending on the distance sprayed as I stated before.

At one time I was showing the gun to a crowd of fruit growers when this point came up. I sprayed a telephone pole until it was dripping, standing about fifteen feet from it. On examining it we found that it only lacked a few inches of covering entirely around the post. The second post was sprayed from the same distance, using about the same amount of water. On examining it we found that only the half next to us was wet. The first had been sprayed with the gun only open enough for the spray to well reach the post where it floated in the air like a cloud of smoke. On the second post the gun was wide open and the spray which did not strike the post was going from ten to twelve feet beyond it. What struck the post on the sides was deflected off

with the driving pressure behind it. It did not roll or cover any of the surface not directly in line with the nozzle. Had this been a fruit tree the results would have been unsatisfactory.

In regard to using the gun on calyx spray. There is the same difference of opinion as I mentioned before, even among our leading horticulturists. I have always contended that the right gun properly operated would do just as effective work as any rod and nozzle and can be accomplished with less labor and liquid. However, as I said before, you must have the pressure to give you a very finely atomized spray. There are different densities of water, from ice to the finest fog. If you would dip a calyx into a bucket of water you would get it all wet, a 100 per cent perfect spray. You, of course, cannot do that in an orchard, but you can take a high pressure and atomize the water. In other words thin it down and entirely envelope the blossoms in a cloud of thin water long enough for the inside of every calyx to be thoroughly coated with spray regardless of the angle at which they stand. This finely atomized spray will enter calyx that are closed too much for a coarser spray to enter and will therefore give you better results than a driving spray which is nearly always a coarse spray.

Care should be used in handling the gun to see that you are not over shooting by having the gun too wide open and driving the spray beyond the blos-

soms instead of filling the area around them with a cloud of spray. You cannot cover the far side of an apple or the inside of a calyx with a solid stream of coarse spray shot from the ground.

Some operators have made a mistake by long distance spraying and too little walking. You will not get the results at thirty feet that you will at fifteen, regardless of the pressure you are using. Bear this in mind and wherever possible get within fifteen feet of the point you want to spray.

Much depends upon the operator regarding material saved and effectiveness. I have known of some instances where there was 40 per cent saving on material, the man doing 70 per cent as much as two men with rods and nozzles. Other instances where one man did more than two men, but kept no record of material. My observations prove to me that one man with a gun will do 80 per cent as much as two men with rods and nozzles with a saving of about 12 per cent in liquid. These same men tell me they are getting a lower percentage of wormy apples than ever before, using the gun for all sprays and getting as low as one-half of 1 per cent wormy apples.

In these days of close competition and small profits it behooves the fruit grower to produce the maximum quality with a minimum spraying cost and the right spray gun will be a big aid in solving the problem.

WHY EXPERIMENT WHEN YOU CAN SPRAY WITH DORMOIL

The Miscible Oil for Dormant Use

FOR THE CONTROL OF
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Aphis, Red Spider
Blister Mite, Pear Psylla
Mosses and Lichens**

"DORMOIL unquestionably gave me satisfactory results on the Leaf Roller."

W. FIKE, Hood River, Ore.

"I have used your DORMOIL for the past two years and have had splendid results."

M. M. HILL, Hood River, Ore.

DORMOIL is Uniform in Quality. Years of use have demonstrated it to be the best and most efficient MISCIBLE OIL

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HOOD RIVER SPRAY COMPANY
HOOD RIVER, OREGON

State Distributors of the "FRIEND" Sprayers



For Better Fruit— “Friend” NEW SYSTEM Sprayers

The only low built,
short turn, cut under,
large wheel
sprayer made

Four Sizes THERE IS ONE FOR YOUR ORCHARD

TESTIMONIALS

Hood River Spray Co.,
Hood River, Oregon.

Gentlemen:

I have been using a large size “Friend” sprayer for two years and as far as I can tell, both from my own experience as well as that of others, it is the best sprayer made.

It has eliminated a large amount of the “troubles” of spraying and does the work so much quicker than other sprayers as to be a great satisfaction. This matter of time saved is of much more value than is represented by the cost of labor saved, for in many cases it means that the spray is put on the trees when otherwise it could not be, on account of bad weather.

I certainly would recommend this sprayer to anyone who has considerable spraying to do.

(Signed) W. J. Cady,
Hood River, Oregon.

“I have used three different makes of sprayers, but never got real satisfaction until I bought a ‘Friend’ sprayer a year ago. They have both power and deliver plenty of material to do efficient work.”

(Signed) Edward E. Lage,
Hood River, Oregon.

“We have used a ‘Friend’ AX sprayer the past season on our 60-acre orchard and same has given us the best of results.

“At this time we would not consider changing to any other make of sprayer on the market, for we believe the ‘Friend’ AX sprayer is far superior to the other sprayers being offered for sale at present.” (Signed)

Harbake Land & Development Co.
By W. W. Hardinger, Pres.
Hood River, Oregon.

Before you decide on any sprayer, see a “Friend” owner. He will tell you what “FRIEND” CONSTRUCTION means—not only in ease and speed in spraying, but in the actual saving of money from fewer replacements, fewer repairs.

THE ORIGINAL



Puts the spray where you want it.
Use it with any machine.

MANUFACTURED BY

Friend Manufacturing Co.
GASPORT, NEW YORK

DISTRIBUTED IN OREGON BY

Hood River Spray Company
HOOD RIVER, OREGON

Northwest Fruit Notes from Here and There

OREGON.

The Hood River Apple Growers' Association still holds in storage about 270,000 boxes of fruit. It received in all for the past season 945,930 boxes.

The apple acreage in Oregon, according to the figures of the Oregon Growers' Cooperative Association, is 50,000. The prune acreage is about 10,000, while that of pears is 13,500.

C. I. Lewis, manager of the organization department of the Oregon Growers' Cooperative Association, is still strong for prunes, notwithstanding present conditions. He says that ultimately, prunes will prove as they have in the past, a good investment.

In the planting of cherries, he calls attention to the fact that the Royal Anne, Bing and Lamberts are not only self-fertile, but also inter-sterile, and that with these varieties must be planted the Long Stemmed Waterhouse or some other good pollinizer.

The Spitzenberg apple is likely to come into its own within a few years, Mr. Lewis says. He believes the time is coming when this apple will sell at a premium as the acreage has been greatly reduced, due to collar rot in

the Inland Empire and winter injury in the Hood River country.

Mr. Lewis is of the opinion that next year will be a good year for apple growers in western Oregon, as the East is not likely to have a bumper crop next season as it did last year.

Jackson County fruit growers, through the Oregon legislative assembly, have addressed a memorial to the Honorable, the Secretary of Agriculture, earnestly petitioning the Department of Agriculture to maintain the frost warning service with which the weather bureau has been serving the growers of the Rogue River Valley for several years, during the spring months when orchard heating is practiced. The memorial says, in part:

Whereas, this service has proven of inestimable value to the fruit growers of that section as a guide in the taking of measures for the prevention of frost damage to their crops, whereby many hundreds of thousands of dollars worth of fruit crops have been saved, and

Whereas, the fruit growers of that district, many of whom were at first skeptical as to the value of frost prevention measures, have rapidly grown to appreciate the value of the same by reason of the results obtained during

the years this service has been maintained by the weather bureau, and are building up a stable horticultural practice of frost prevention measures under the direction of the weather bureau's representative sent to the valley each spring.

Therefore, be it resolved, that the legislative assembly of the state of Oregon earnestly petitions the Department of Agriculture to maintain the frost warning service hereinabove referred to without interruption, to the end that many thousands of dollars worth of fruit crops may be saved to the growers of southern Oregon.

Gordon Brown of the Hood River experiment station is doing a real service to local growers contemplating setting out nursery stock this spring, having procured the names of Washington nurserymen who can supply stock in quantities. There is a heavy demand for small fruit and berry plants in the Valley, and several hundred acres will be set this spring.

The organization of the Oregon Mint Growers' Association to further the production and marketing of peppermint oil was completed at a meeting of growers at Eugene, recently.

Professor A. Zietle, head of the school of pharmacy of Oregon Agricultural College, spoke to the growers on the methods of harvesting and curing the crop and the most effective manner of distilling the oil. The plan of the Oregon Mint Growers' Association is to link together all the mint interests of the state in production and marketing, and it was shown by statistics that it would be possible not only to increase the revenues from the industry, but to quadruple the output in the Valley, which was about 10,000 pounds last season. With their own refinery in the Valley, operating under the best methods, it is believed that the growers will derive a far greater margin of profit.

WASHINGTON.

Washington's shipments of white potatoes were slightly greater by Christmas last year than they were at the same time in 1919, 2,022 carloads being shipped last year and 1,874 shipped the year preceding.

Frank Miller, manager of the Zillah branch of the American Fruit Growers, Inc., recently made a statement against the packing of 5-tier apples in a year such as 1920. He said, in part:

"There would have been a different market situation today had we let alone packing 5-tier stuff for home consumption.

"The growers would actually have made more money, for the large sizes would have brought them more per box and they would not have had the loss which they are now sustaining on the 5-tier stuff. It clearly was a hinderer to pack the 5-tier, but no concert of action was possible and with some concerns packing them of course the rest did the same."

What is the answer? Is it cooperation?

Whereas there have been a good many sales lately of Wenatchee Winesaps at \$2.00 per box, the large sizes are held at \$2.50 to \$3.00. Holders of the big sized fruit are confident that they will realize more later in the season.

It is estimated that the Wenatchee district has grown 9,200 cars of apples and has shipped 7,500 cars, leaving 1,800 cars still to be disposed of.

Apple shipments for Washington for 1920 up to December 25 fell 1,400 cars behind the shipments for 1919. The shipments for last year was 14,712 carloads as compared with 18,958 at the corresponding date of 1919.

Prosser fruit men agree that present indications favor a dry crop next season. Orchardists are convinced that trees have recovered from the damage occasioned by extreme weather last winter. There has been no zero weather this year. E. Bowles, who harvested \$11,480 worth of cherries from 6½ acres in 1919 and got virtually no crop last season, was of the impression last winter that his trees were nearly all killed, but he now reports that he lost only 11 trees out of his entire orchard and that he is assured of a heavy crop next season.

Manchurian Walnuts.—In the month of January, 1920, there were 4,000 sacks—approximately 200 tons—of walnuts imported to the Port of Seattle from Manchuria, China. These arrived after the holiday season of 1919. There was little sale for them as we understand, and they were held in dry storage during the hot months of 1920, allowing them to become rancid and unfit for food, after which they were placed in cold storage for a few months and then placed on the market for sale about

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WORLD'S LARGEST MAKERS OF STUMP PULLERS

Thanksgiving Day, 1920, or the beginning of the 1920 holiday season. The standard on walnuts is they must be 85 per cent or more good; two shrivelled nuts counting as one. These walnuts were traced over the state to Spokane, where we found them in the hands of retail dealers, transfer, express and railway companies. They were seized, samples taken, sent to the state chemists, and found to run from 32 to 80 per cent bad. The original shipment at Seattle was seized, and now the State Food Division has "nuts to burn."

Twenty-six tons of potatoes to the acre is the record made by Edward J. Bedard of Cowiche, who planted five acres with Minnesota seed last spring. Mr. Bedard gave the crop personal attention and irrigated it five times, each application being light. The total yield for the five acres was 130 tons and potato men say it was a perfect crop in every respect.

IDAHO.

A pamphlet is being prepared which will show that the work of the University of Idaho extension division, in cooperation with the county farm bureaus, has added \$6,716,000 to the profits of Idaho agriculture in the last two years, according to an announcement from the office of L. W. Flaherty, director of extension. This seems like a big sum for farm bureau and extension work to have added to Idaho farm profits in two years, but when you consider that 10,000 farmers have helped to make and save it, it doesn't look so large.

Idaho's apple shipments up to December 25 last amounted to 2,312 cars compared with 3,197 carloads for 1919. The state shipped 4,193 carloads of white potatoes in 1920, as against 5,002 cars in 1919.

\$3,000 Extra on Cherry Crop.—Organization of a cherry growers' association is considered by the county farm bureau the outstanding feature of its horticultural program for the year just past. The association obtained a price for its cherries that exceeded previous offers by three cents a pound and represented an added profit of \$3,000.

Five hundred thousand acres of arid land lying between Boise and Mountain Home may be thrown open to irrigation through a tunnel from the Stanley Basin.

What They're Doing in California

California is the leading honey producing state of the Union, and the Sacramento River and the bottom land area produces tons of honey each year, purely as a by-product of other crops, for blossoming plants such as alfalfa, fruit trees and the wild shrubbery and flowers along the banks of the river afford an abundance of nectar for the busy insect. Sutter County, in which Sutter Basin is located, boasts of thousands of stands of bees. Most of these are of the perambulating type for the owner transports them about, following the honey flow. One grower has 2,000 stands and carries them up and down the Sacramento River on a small barge, placing them on the banks of the stream where the blossoms are abundant. At certain seasons of the year he even takes some of his stands over into Nevada to gather sagebrush honey. California honey producers are organized into a cooperative association and they are marketing the product direct to the trade. Only recently they made their first shipment direct to New York. This shipment consisted of 100,000 pounds, which went by steamer through the Panama Canal.

The annual meeting of the California Fruit Exchange in Sacramento and it is stated refunds aggregating between \$675,000 and \$700,000 to the growers was made by the organization. John L. Nagle, manager of the exchange, announced that the refund totaled 5 per cent of the gross sales of the year, the total business amounting to \$13,500,000. Last year the dividend amounted to 4.72 per cent, while the disbursement of the previous season was 4.47 per cent.

Potato growers of Marin and Sonoma Counties met in San Francisco recently and formed a potato growers' association under the prefix of "Northern California."

As the result of the committee of seven appointed by the governor meeting with forty representatives of various railroads in Chicago recently, the railroads agreed to a sched-

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MANUFACTURED BY
F.E. MYERS & BRO.
ASHLAND PUMP AND HAY TOOL WORKS
135 ORANGE ST.
ASHLAND, OHIO.



You are going to spray again in the near future. No doubt you are thinking about it already. Just a question of a few weeks until the weather is right then the fight against the numerous enemies of plant and tree life will be renewed with vigor. Perhaps, your old spraying equipment is about worn out and will have to be replaced with new. Possibly, you will only need a new nozzle or two, a spray gun, some hose or fittings to put the outfit you have been using in good shape and thus make it do for another season.

Whatever your need, be it small or large, it can be satisfactorily met from the MYERS line of "Honor-Bilt" HAND and POWER SPRAY PUMPS and ACCESSORIES for Spraying, Whitewashing, Coldwater Painting and Disinfecting. Regardless of style or size, or method of operation, MYERS SPRAY PUMPS combine efficiency and durability with economy, and thus produce a standard of spraying service difficult to obtain through the use of other spray pumps.

Our new Spray Pump Catalog, No. SP21, which not only shows the complete line of MYERS SPRAY PUMPS and ACCESSORIES, but also devotes many of its pages to spraying calendar, reliable formulae and instructions "How and When to Spray," is ready for distribution. Whether you need a new Spray Pump or not, you should have a Myers Spray Pump Catalog to refer to when doing your spraying. Just drop us a card. Without the least obligation on your part, we will mail you a copy and if you so desire, tell you how and where you can quickly obtain MYERS SPRAY PUMPS—Write today, the 1921 Edition is limited.



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WRITE
US

ule of eight days to Chicago and twelve days to New York, instead of the nine and thirteen days time existing at present.

The deciduous tonnage rolling east out of California this year is approximately 10,000 cars and it is anticipated that the tonnage of deciduous fruits in five years' time will be close to 100,000 cars. It is also stated that about 60 per cent of the citrus acreage is bearing at this time but that the production from the bearing acreage is around 60,000 cars and it is estimated that the movement of citrus fruits will be increased by 6,000 cars per year for at least the next five years.

Notes Oregon Growers' Association

C. I. Lewis, with the Oregon Agricultural College 11 years as chief of the horticultural department, and now manager of the organization department of the Oregon Growers' Cooperative Association, advises the planting of the Bartlett, Bosc and Clairgeau pears. The Anjou is not favored as it has a functional disease and is slow coming into bearing. Nor does Mr. Lewis recommend the Winter Nells, as it does not produce large fruit in western Oregon.

R. C. Paulus, sales manager of the Oregon Growers' Cooperative Association, reports the pear pool for this season amounted to \$153,590.47. Bartletts ranked first with sales of \$241,996.97 with the Bosc second, its sales amounting to \$78,211.55. Anjou pears were third with sales of \$56,871.52 and Winter Nells fourth with sales of \$11,000.00.

C. I. Lewis of the Oregon Growers' Cooperative Association believes in the future of the

apple industry of Oregon. He says history repeats itself in apple crops, and that next year the West may look for a big crop, with a short one in the East.

Although there was the largest pear crop in the United States last year ever known, members of the Oregon Growers' Cooperative Association received the highest prices on record west of the Cascades. This was due to skillful handling by the association, holding pears in cold storage and awaiting favorable market conditions.

From the Oregon Growers' Cooperative Association comes this information to those who intend to plant cherries: With the Royal Anne, King or Lambers, which are not only self-sterile, but inter-sterile, plant about one-fourth in Long Stemmed Waterhouse, or some other good pollinizer.

It is now the prune rather than the raisin when it comes to mince-meat. J. O. Holt, packing manager of the Oregon Growers' Cooperative Association, at the Eugene plant, is making a prune mince-meat much better than that manufactured with raisins by the big packing plants. It is just another way of patronizing a home industry, even if you make your own mince-meat. Use prunes and help Oregon.

The name "Mistland," by which the Oregon Growers' Cooperative Association is selling Oregon prunes in New York City, seems to be quite a favorite. Now we have in Salem a Mistland gun club, a Mistland bakery, and even a Mistland orchestra.

The large prune dryer constructed by the Oregon Growers' Cooperative Association at Sheridan, has been completed at a cost of \$20,000. The dryer is of 40 tunnels capacity.

Bits About Fruit, Fruitmen and Fruit Growing

Department of Agriculture reports the value of farm crops for year 1920 as around \$9,000,000,000, as against \$11,000,000,000 for the year preceding.

The federal horticultural board is now admitting fruits from Cuba, the Bahamas, Jamaica and the canal zones only after vacuum fumigation.

The steamers "Marconi" and "Vauban" recently arrived at Buenos Ayres from New York with 21,000 packages (boxes and barrels) of apples and 4,000 boxes of pears. Particular mention for arrival in good condition was made of boxes from Hood River, Yakima and Payette.

SPRAYING PAYS.

Barth Irwin of Lancaster, Wisconsin, found that spraying his orchard of 680 trees returned him 5.487 per cent on his spraying investment. This is the report he made to F. R. Gifford, extension man for the horticultural department at the Wisconsin College of Agriculture, who aided him. It cost Mr. Irwin, according to his records, \$228 to buy the spray and apply it. It took 1,500 gallons of mixture for each of the four applications, and 20 hours' work on the part of two men and a team. The eighty hours work he figured at \$140. On one sprayed tree, an average one, he picked eight bushels of clean marketable fruit which sold for \$2.50 a bushel. There 30 unmarketable apples on this tree, and these were only slightly injured. On one tree which was purposely let unsprayed, four bushels were picked. The ground was covered with rotten apples. Of the four bushels of apples taken from the tree, but 10 apples were clean.



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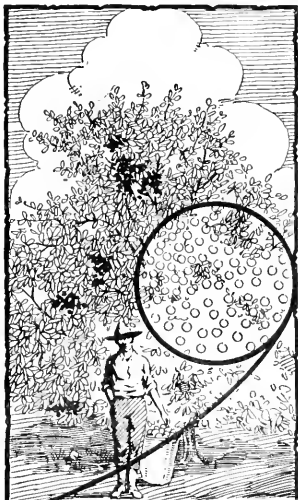
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The grocers refused to buy them for \$1. The market value of the apples on the sprayed tree was \$20; from the unsprayed tree about \$1. It cost 34 cents a tree to make this difference. Of course, he says that spraying pays.

Senator McNary is doing his utmost to secure a tariff on cherries and English walnuts. Italian cherries are now selling in New York City at seven cents a pound in brine. Unless there is a tariff the cherry and walnut industry of the Northwest is in for several hard seasons.

The purchasing department of the Michigan State Farm Bureau is developing rapidly. It estimates conservatively that it saved members \$20,000 during November and December. The State Horticultural Society has placed in the hands of the purchasing department the business of handling spray materials for its members. Cooperation properly applied makes converts wherever practiced.

Chinese and Japanese walnuts were selling last month at seven cents a pound wholesale. The meat is dark and often wormy, but the average buyer did not know the difference between the Japanese and the sweet meat Oregon walnuts until they got them home. Hence the need of a protective tariff.

HOW SHALL THE FRUIT GROWER PAY HIS INCOME TAX?

The government allows the farmer to make his income tax return in one of three ways, namely: On the cash basis where he accounts for all receipts and disbursements only; on the crop basis where he deducts the cost of raising each crop from the proceeds of its sale; and on the accrual basis where he takes inventories and accounts for all sums owing him from the sales as well as for the sums received and deducts all expenses, whether paid or merely incurred. Practically all income tax returns of farmers in this district have been made on the first basis mentioned, namely, the cash basis, and it is this class of taxpayers that are most interested in having their expenses allowed against their income from sales of grain in 1921.

The big question is how the farmer who has sold only part of his 1920 crop can get credit for all of his expenses incurred in 1920 against the income from the sale of the entire crop, sold in 1920 and 1921. The answer to this question is that the farmer must change his system of accounting from the cash basis to the accrual basis and set up an inventory of his crops on hand on December 31, 1920, valued at market price less the cost of marketing. But this change must be carried out strictly according to regulations, which are as follows:

Treasury decision 2,873, Paragraph 3 reads: "A taxpayer who changes the method of accounting employed in keeping his books for the taxable year 1919 or thereafter shall, before computing his income upon such new basis for the purposes of taxation, secure the consent of the commissioner. Application for permission to change the basis of the return shall be made at least thirty days in advance of the date of filing return and shall be accompanied by a statement specifying the classes of items differently treated under the two systems and specifying all amounts which would be duplicated or entirely omitted as a result of the proposed change."

There were 79,133 barrels and 77,342 boxes of apples shipped to Europe from American ports during the week ending January 15. Of these, 51,586 barrels and 74,239 boxes were shipped from ports of the United States, 32,109 barrels and 62,025 boxes going out of New York alone. All of these were shipped to British ports with the exception of 4,317 boxes which went to Scandinavian countries.

Cable advices give the following apple prices prevailing in various British cities: Baldwins in London \$7.03@8.32 per barrel; in Manchester \$4.62@6.17; in Hull \$6.47@7.77. Yorks in Glasgow \$5.18@6.29; in Southampton \$6.10@8.32; Greenings in London \$7.03@8.32 per barrel. Box apples—Winesaps in London \$2.77@3.15; Oregon Newtowns in London \$3.42@4.07. California Newtowns, four and one-half tier, in London \$3.21; Spitzenbergs in boxes at Southampton \$3.24@3.42; box apples in Manchester \$2.60@3.15.

The first shipment of the season of South African peaches and plums reached New York on January 24th on the steamship "Adriatic." F. A. Richmond & Co. being the receiver. The fruit is from the orchards of Dutch growers in Cape Colony, and is remarkable for the careful and dainty manner in which it is packed. The carriers are small, flat boxes holding 24 peaches or 40 plums. Each peach

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or plum is wrapped in tissue paper, and then bedded in a nest of excelsior. The receivers state that prices will be \$10.00 to \$12 per box for either peaches or plums. The fruit is mostly the same varieties grown in the United States, especially in California, the peaches being all Alexanders, while the plums are of the large red and purple varieties so well known in this country, the bulk of this shipment being Santa Rosas. Later, it is said, Wickson, Kelsey and other familiar varieties of plums will be coming. Although the shipment had been on the way for fully 30 days, the fruit showed excellent condition.

The rally in sterling exchange will benefit Northwest apple growers, according to Walter R. Woolpert, of the Dan Vuille Co. at Hood River. With exchange at \$3.73, according to Mr. Woolpert, growers here will net \$1.88 per box for all apples sold at the control price of 23 shillings, 6 pence.

"We have received no notification," says Mr. Woolpert, "that the British government will lift price restrictions on March 31, as announced from other sources. That would be too late to be of any benefit to us. Indeed, I cannot see how the lifting of control would benefit us any at present, for it is found difficult to keep apples at the control maximum

because of such quantities going on the auction. Practically all Hood River Newtowns, however, have to date, brought the maximum. As for the arrival of Australian apples, I do not see any cause for alarm. The Hood River crop will be well sold before they reach England."

Cannery Notes

There are 32 canning establishments in Czechoslovakia, very few of which, if any, having canning machinery such as is used in the United States, is the information contained in a report from Trade Commissioner Geringer, of Prague. It is believed that a potential market exists there for canning machinery, and Mr. Geringer believes it would be well for American interests to send their catalogs and price lists to his office, where they may be shown to interested parties. Material addressed to Mr. Vladimir A. Geringer, in care of the Bureau of Foreign and Domestic Commerce, Washington, D. C., will be forwarded to that office.

The Northwestern Transportation Company whose boats ply between The Dalles and Portland on the Columbia River, reports that from

Hood River alone approximately 60,000 boxes of apples were moved to Portland and Vancouver, Washington, the past season by river steamers. A big proportion of the tonnage was consigned to canneries, one plant in Vancouver handling 25,000 boxes of canning grade apples.

DEHYDRATING PLANT CLOSES.

The Dalles Kings Food Products plant has closed its plant for the season. According to C. R. Moss, manager, the plant has enjoyed the biggest year of its history, having handled 2,250 tons of apples alone. The Libby, McNeill & Libby canning plant will close as soon as the Moraschino cherry run is over. Both will open as soon as the harvest of spring vegetables begins.

ECHOS FROM THE ANNUAL CONVENTION OF NATIONAL CANNERS.

The fourteenth annual convention of the National Canners' Association, meeting simultaneously with the Canning Machinery and Supplies Association and the National Canned Foods and Dried Fruit Brokers' Association at Atlantic City was one of the best in the history of these organizations. The registration was about 3,000.

The newly elected officers are as follows: Harry P. Strasbaugh of Aberdeen, Md., was elected president of the National Canners' Association; James Moore of Rochester, N. Y., was elected first vice-president, and Frank E. Gorrell, Washington, D. C., secretary-treasurer. The office of second vice-president was created and will later be filled. The following new directors were elected: V. E. Ellwell, Portland, Me.; Albert Horner, Honolulu, Hawaii; L. E. Jastrzemski, Houma, La.; James Moore, Rochester, N. Y.; G. A. Eastwood, Chicago, Ill.; Richard Stringham, Woods Cross, Utah; Ralph Polk, Mount City, Ill.; John M. Swing, Ridgely, Md.; B. F. Moonan, Roanoke, Va.; E. F. Trego, Hoopeston, Ill.; Bismark

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ONE OF THE RESOLUTIONS.

Whereas the canning industry, by reason of its seasonal character has need of large credit accommodations in the normal production and marketing of its products, and

Whereas in case the purchase of canned foods in 1921 by future contracts is greatly reduced, the canners will need unusual credit accommodations, if canned foods are to be produced and carried by the canner until they are needed by the consumers, and

Whereas, this economic essential was admirably stated by the Lever food act, when, in formulating the principles of food conservation, it urged the development of surplus products in the season of natural maximum production, to be carried over into the season of scant or no production, therefore be it

Resolved, that the peculiar condition of the canning industry be fully presented to the federal reserve bank and every possible effort be made to secure their cooperation in extending to the canning industry the full measure of credit to which it is entitled.

The National Canners' Association assembled in its annual convention, representing as it does an industry with an output of an approximate valuation of \$800,000,000 annually, employing approximately 250,000 people, hereby resolves that it be the sense of this convention that the ways and means committee of the House of Representatives be requested to give due consideration to the depressed condition of the industry and to the needs of its various branches. Under the present low import duties, canned foods are coming into this country in increasing quantities from countries where their industries operate upon a lower scale of wages not compatible with the standards of living enjoyed in this country.

We earnestly recommend a duty placed upon all imported canned foods sufficient to offset the difference in the cost of production. This recommendation is made not merely as a means of protection to the industry and as a source of revenue to our government, but as a means for the negotiation for more reasonable tariffs in most foreign countries which now levy prohibitive tariffs upon the products of our industry.

It is believed that in the framing of our new tariff laws due consideration should be given to the necessity for devising reciprocal features which will enable some competent agency of the government to meet promptly the rapidly changing conditions abroad whereby countries now enjoying a ready market in this country may be required to lower unreasonable and prohibitive tariffs now levied

in many foreign countries against canned foods and many other products requiring an export market.

Plans are under way for the erection in Yuba City, California, of a new cannery. Sutter County is the largest canning peach district of the state and annually ships out 2,000 cars of canning peaches, in addition to those canned by local plants.

O. A. C. Horticultural Notes

COST OF EFFECTIVE SPRAYING.

The cost of a season's effective spraying in Hood River orchards 13 to 14 years old from 1916 to 1919 was about \$45 an acre. Growers employing the average usage of spray per tree each application obtained uniformly good results.—*Experiment Station, O. A. C.*

Spreaders for improving the covering and sticking power of spray solutions are caseinate, glue, gelatine, soap bark and oil emulsions, named in order of their efficiency and cost of preparation. Directions for preparation and use are found in the bulletin, "Insecticide Investigations," for free distribution.—*Entomology Department, O. A. C.*

The total estimated annual millage levies will amount to \$5,752,379.47 of which O. A. C.'s share will be \$1,127,436.41.

Many rainfall farmers of western Oregon have gone back to the intermountain regions of Montana and Idaho looking for new land, forgetting the marshes and tidelands in their own back yard, which, if drained, become the most profitable lands in the state for such crops as garden truck and vegetables, and small fruit and berries. Drainage specialists will help them find out when and how the lands may be reclaimed.—*Experiment Station, O. A. C.*

The physical value of products turned out by Oregon boys and girls in club work in 1920 was \$111,581.60, more than half of which are clear profit. The profit balance was \$55,942.90, as shown by the reports of H. C. Seymour, state club leader.

A. G. Bouquet, professor of vegetable gardening, spoke to the horticultural seminar on "Horticulture in England." He brought out the fact that there is a close connection between Great Britain and the United States in horticultural lines due to our exports. Sixty per cent of the apples exported are sent to Great Britain. The English growers are striving by means of the box pack, not before used to any extent in England, to obtain better recognition of their own fruit. Gooseberries and plums are used as dessert fruits by most Englishmen, according to Professor Bouquet.

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Complete and full information is yours for the asking.

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Soil Analysis and the Fertilizing of Orchards

By Major E. P. Newsom, Lecturer on Chemistry of Soils Fertilizing

UNDER normal mechanical conditions of soil and water supply, the chemical nature of the soil is reflected in the life, appearance, behavior and fruitage of the tree. Soil analysis is not the angle from which to attack the problem of fertilization. It is an outworn theory and should be thrown into the discard along with that other passe theory, so much in vogue a few years ago, "clean cultivation."

Let us admit that in the Yakima and Wenatchee Valleys we have rock phosphate and potash sufficient for a great number of years, does it follow that we should fertilize with nitrogen and a cover crop alone? By no means. Tell that to the expert horticulturist of the East or Europe, and he will laugh in your face.

Sources of Potash.

The chief sources of potash in the soil are from feldspar, granite, hornblend, etc., in which rocks it occurs with aluminum in the form of a double silicate. Mud pumped up from the sea to form new land around our city harbors is impregnated with salt, and for the space of two years not even grass will grow on it. But the rain falling upon this newly made land causes the salt to leach down deeply in the soil, and after the space of two years any kind of vegetation will grow upon it. Now, if the rock phosphate and potash were soluble, the same thing would happen—these plant foods would leach down in the soil so deeply within two years, that a farmer could not sprout cow peas on his land.

The double silicate of aluminum and potash is absolutely insoluble in water. The erroneous impression prevails that the use of superphosphate releases the potash. Phosphoric acid acting upon the double silicate of aluminum and potassium gives the double phosphate of aluminum and potash, which is just as insoluble as the double silicate. Carbonic acid, however, being a very weak acid, does not attack the aluminum silicate, but having great affinity for the potassium, does attack the latter, forming carbonate of potash which is soluble.

Some College Experiments.

That phosphoric acid used alone does not release any appreciable amount of potash is clearly shown by the experiments of the Pennsylvania State College, covering a period of 35 years. The analysis of the soil plats showed the presence of 20 pounds of potash for every one of nitrogen, and 25 pounds of potash for every one of phosphoric acid. One would naturally suppose, if the soil analysis theory were of any value, that if any plant food additional were needed it would not be potash, but rather nitrogen and phosphoric acid, especially so, if the phosphoric acid acted to release and render soluble the superabundance of potash. The results, however, showed that in a rotation of clover, corn, wheat and oats,

covering a period of 35 years, the highest net return on this soil came from plats on which phosphoric acid and potash were applied at the rate of one pound of the former to 2.08 pounds of the latter. Again, these long continued experiments further showed that when either potash or phosphoric acid were used alone, or even nitrogen used alone, the net results were always lessened.

Now, a cover crop of the nitrogen gathering legume is most excellent

since it furnishes nitrogen to the tree from the air and since it fosters through its humus the bacterial life. This bacterial life in functioning generates carbon dioxide and this when absorbed by water furnishes a mild acid, carbonic acid, which is a solvent for calcium carbonate (limestone), rock phosphate and potash. But the bacteria work slowly. One year there is a good crop of fruit, the next year is a "skip" crop, and the third year, perhaps, another good crop. Now, if the soil analysis theory were of any value and we should not use potash and phosphoric acid in our fertilizer, why this "skip" crop?



Clear More of This Land in 1921

PEOPLE in this state are rapidly joining the "Clear-More-Land" movement. Last year was one of the largest land-clearing years in this section. During 1921 an even greater acreage will be cleared and cultivated largely thru the use of explosives. Every one is out to get bigger crops. Most people use



or Repauno Stumping Powders

because they are generally recognized as quick, efficient and economical means of clearing cut-over land.

Join your neighbors. Clear *more* acres each year. Every acre put under cultivation will return a handsome profit to you.

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Simply because the bacteria could not, or did not, work fast enough to render "available" in sufficient amount this potash and phosphate in the soil.

One might as well put brick dust in the soil as to put available potash and phosphoric acid there, expecting results, unless, at the same time, he is absolutely sure that the tree is fed a sufficient amount of nitrogen. Nitrogen forms the wood structure and healthy leafage of the tree. The leaf of the tree is its stomach. It is in the leaf that the chemical changes take place in the plant food drawn up. How foolish therefore to experiment on orchards with potash and phosphoric acid alone, if the tree has not sufficient digestive ability to "eat" it. One might as well place food before a sick man whose

stomach is in no condition to receive it. On the other hand, a tree can be fed up on nitrogen and given stomach capacity like unto that of the fat man of the circus and yet there may be no fruit because the phosphate had not been transformed into available phosphoric acid and the silicate, or some other form of potash had not been transformed into the soluble carbonate of potash. Place the fat man behind iron bars and then a plate of food on the outside, where, perchance, he may see it and smell it, but cannot get it, and what good will it do him?

I believe most thoroughly in a three powered fertilizer, carrying nitrogen, phosphoric acid and soluble potash, varied in ratios to suit the needs of the tree as indicated by its behavior, ap-

pearance, fruitage and coloring of that fruitage.

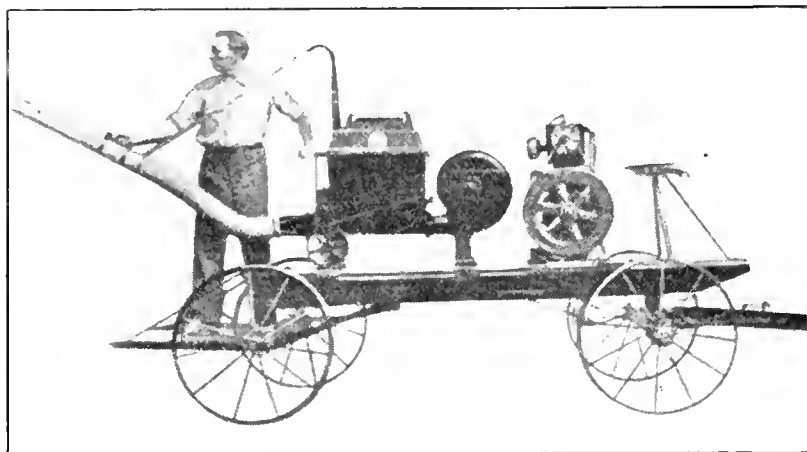
Mr. Leonard Olive of Chelan took me over his orchard, explaining that he had used considerable barnyard manure; that his trees appeared to have plenty of wood growth and healthy leafage, but he was not getting fruit. I prescribed an organic fertilizer of 1 per cent nitrogen, 8 per cent phosphoric acid, 10 per cent potash. I am just in receipt of a letter stating that he had a wonderful crop of fine quality apples and splendidly colored.

Mr. Rudolph Etzkorn, Jr., of Monitor, had a tree, 15 years old, that for the past eight years had never in any season borne more than five boxes of apples which were small and of poor quality. He had used barnyard manure, had cultivated it, but to no avail. The tree appeared "sick." He used an organic, or animal products, fertilizer of the analysis of 6 per cent nitrogen, 10 per cent phosphoric acid, 4 per cent potash. Recently a photograph was taken of this tree, showing 20 boxes of the finest "Jonathans" I ever saw, under the tree, already picked from it, while there were eight more boxes, estimated, on the tree—28 boxes.

Now, if the "soil analysis" theory were tenable, humus and plenty of nitrogen were all this tree needed, and all that Mr. Leonard Olive's trees needed and all that a host of the trees of others needed, since according to the "soil analysis" theory "there is an abundance of phosphate and potash in the soil, sufficient for years, and all that is needed is an abundance of nitrogen and a cover crop."

I have gone over orchards in Oregon and Washington and time after time I have seen trees and sometimes almost the entire orchard—and such I have seen in and around Yakima—that had a lovely cover crop and beautiful green trees, but without apples on them. Is it because the trees get tired and have to rest a year, in accordance with another one of those outworn theories? Surely, if there is an abundance of potash in the soil, etc., all they need is nitrogen. Well, do the trees look like they were not getting nitrogen?

Yes, there is potash and phosphate in the soil, but nitrogen does not render it available. It only enables the tree to "eat" these elements of plant food, when it is available. The bacteria render these elements available, but they work slowly, hence the "skip" crop. A well balanced organic fertilizer invigorates and multiplies the bacterial life; it supplements, in abundance, available plant food, while these micro-organisms are working to render still more of the unavailable available.



THE NIAGARA DUSTER—THE CROP PROTECTOR

The DUSTING METHOD becoming better understood, is being adopted by many of the progressive growers in Oregon and Washington, and of course they use the NIAGARA DUSTER.

A White Salmon, Washington, apple grower writes, under date of September 25, 1920:

"We are quite satisfied with the way the Duster worked out this year."

You, too, will join the Duster boosters, but right now you need a STRONG, RELIABLE SULPHUR SPRAY.

Niagara Soluble Sulphur

LEADS THE WORLD IN SULPHUR SPRAYS. Tried and proven—a successful record of nine years' use. For several years sold in the Northwest under LILLY'S brand.

NIAGARA is NOT a "Dry LIME-sulphur." NIAGARA is a true SODIUM-SULPHIDE COMPOUND. Perfectly soluble in cold water—no waste—no sediment. Compared with Lime-Sulphur Solution, two pounds of NIAGARA are equal to one gallon Standard Concentrated Solution.

A 100-pound drum of SOLUBLE SULPHUR equals a 50-gallon barrel of Lime-Sulphur Solution. NO DRY LIME-SULPHUR CAN BEAR THIS COMPARISON IN SPRAY VALUE. DON'T CONFUSE NIAGARA SOLUBLE SULPHUR WITH ANY DRY LIME-SULPHUR.

Niagara Soluble Sulphur

Is sold by LILLY'S, in Seattle and Portland.

For full information on Niagara line, Dusters, Dusting Materials, Sulphur, Arsenate of Lead, Calcium Arsenate, etc., write

F. A. FRAZIER

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Sulphur

It has been proven and so recommended by the University of California that if you sulphur your grape vines and orchards 6 times they will not be affected by MILDEW or RED SPIDERS.

ANCHOR Brand Velvet Flowers of Sulphur, also EAGLE Brand, and Fleur de Soufre, packed in double sacks, are the fluffiest and PUREST sulphurs that money can buy; the best for bleaching purposes, LEAVING NO ASH.

VENTILATED Sublimed Sulphur—Impalpable Powder, 100% pure, in double sacks, for Dry Dusting and making Pasta Sulphur.

For LIME-SULPHUR SOLUTION, use our DIAMOND "S" BRAND REFINED FLOUR SULPHUR. We can furnish you this sulphur at such a low price that it would pay you to mix your own solution and net you a profit equal to the amount paid out for labor in spraying your orchard, even if you pay your men \$5 per day for making the solution and applying same.

To create additional available plant food, and prevent smut in grain, drill into the soil 220 pounds per acre of DIAMOND "S" BRAND POWDERED SULPHUR, 100% pure, or our COMMERCIAL POWDERED SULPHUR. This soil treatment has increased various crops up to 500%. Send for Circulars No. 6, 7 and 8.

Ask us for prices on PREPARED DRY DUSTING MATERIALS, Tobacco Dust, Dusting Sulphur Mixtures, etc., Fungicides and Insecticides, carried in stock and mixed to order.

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We are equipped to make immediate shipments. Send for Price-list and Samples.

Ask us for prices for Carbon Bisulphide, the surest remedy for destroying ground squirrels.

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That you are getting full value for your money when you use this class of tobacco.

The good, rich, real tobacco taste lasts so long, you don't need a fresh chew nearly as often—nor do you need so big a chew as you did with the ordinary kind.

Any man who has used the Real Tobacco Chew will tell you that.

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fruit
WRAPPERS



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"Caro" Protects-- "Caro" from DessiCARE (to dry up) --"Caro" Prolongs the Life of Fruit--Why?

FRUIT MATURITY is retarded by cold or refrigeration and hastened by heat or atmospheric exposure.

The soft fibrous silk-like texture of "Caro" provides just sufficient ventilation to retard the ripening process.

FRUIT DECOMPOSITION starts from a bruise which opens tiny holes and permits juice to escape and BACTERIA to enter.

"Caro" clings closely and dries up the escaping juice. "Caro" ingredients harden the spot, kill the BACTERIA, arrest the decomposition.

United States Distributors, AMERICAN SALES AGENCIES CO., 112 Market Street, San Francisco, Calif.

With the Poultry

Inquiries Answered

Contributions Solicited

POULTRY PROBLEMS.

It has been demonstrated time and again that no part of the farm work pays so well for the time and money spent upon it as does the poultry when efficiently managed. This is particularly true when the poultry are raised in connection with orchard work. It has been found that scrub hens, with but little care, will pay a profit. How much better then must the good hen with good care pay? A good hen will pay so much better that no reasonable person would be willing to go back to scrub hens after handling the good ones two or three years. If they laid no more eggs, they are so much more pleasant to handle, that we would rather keep them for that reason alone.

With the advent of purebred stock, the wives and daughters of many fruit growers have become interested in the care of poultry, mainly on account of the beauty of a uniform flock, and they have found the profits coming in. As a result, poultry raising has become a fixed industry on many fruit ranches.

Most women are well qualified for the work because they are accustomed to looking after details and the poultry business is one that makes much of the little things. The breed of poultry that may be raised with greatest success depends largely on the individual and local conditions. Some fruit ranches are ideally located for a large flock of Leghorns, where they can have unlimited range and there is nothing that they can harm in their foraging. In other localities, where gardening is carried on to a considerable extent, a heavier or general purpose breed is best because they can be easily yarded or confined to limited ranges during certain seasons when, if running loose, they would harm growing vegetables. Then, too, such breeds produce much more and better market poultry when that phase of the matter is considered.

There is no question about good poultry paying well in connection with orchard work. It is for each individual fruit grower to decide what breed is best suited to his needs.

POULTRY POINTERS.

Now you will have use for those roosters you have kept all the year and lost money on.

The incubator is the hen that never leaves the nest.

It is more difficult to raise than it is to hatch chicks. Isn't that your experience?

Don't feed the chicks for 24 or 36 hours after hatching; then give chick food.



VIRGINIA GAMES

Fancy Black Breasted Red exhibition games; game fighters, excellent layers, fine brooders. We are now looking orders for both eggs and adults.

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Waynesboro, Virginia

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Triangle Brand Liquid Asbestos Roof Cement is a composition of asphaltum, asbestos and other materials fused to a consistency of heavy molasses. It is absolutely waterproof and fire retarding. Comes in barrels ready for use. Applied cold. Anyone can apply it. Will positively make your warehouse waterproof. Saves money.

Write—Our representative will call—anywhere.

Asbestos Products Co.

S 113 Madison Street
SPOKANE, WASHINGTON, U. S. A.

Good poultry books or pamphlets may be secured by writing to the Department of Agriculture, Washington, D. C. Give them your name.

Fresh green cut bone is great food for growing chicks. Feed sparingly of it, though. This same green bone is also good for the hens that fill the egg basket.

Skin milk is a good feed for the growing chicks. It takes the place of meat.

More chicks are killed by over-feeding than by starvation. Feed a little frequently rather than too much.

Good brooders may be made at home, but it is usually cheaper to get the manufactured ones.

SELECTING BREEDERS.

Summer-hatched chicks won't do for the early breeding pen. If you must use late-hatched birds for breeding purposes, give them time to mature and do not try to hatch extra early chicks. Even when a late-hatched male bird gives promise of exceptional merit, he will not be as potent as the fully matured bird if he is used too young and his chicks will be lacking in size and vigor, and the chicks from an immature pullet will never amount to much. The habitual use of immature breeders will injure the size and constitution of any flock.

GETTING WINTER EGGS.

Any kind of food adapted to egg production will do if the poultry houses are warm enough. Warm mash or cooked vegetables, thickened with bran should be given the fowls occasionally, but the necessity for furnishing warm food will be in proportion to the warmth of the quarters. A plentiful supply of water should always be kept before the hens. If the quarters are not warm enough to prevent the water from freezing, better carry out warm water two or three times a day.

MEAT FOR POULTRY.

An excellent substitute for meat is cottage cheese. It may be fed to fowls of any age and will be found to be very nutritious. We would recommend about three feeds each week of the cheese. We have often heard the inquiry, "Can I not use fresh cooked meat in the place of beef scraps?" In our opinion, yes. If fresh cooked meat may be fed as cheaply as, or better still, cheaper than beef scraps, it will answer every purpose. It should be fed in the same manner and will yield about the same results. Either may be fed to young chicks or to older ones. It is a paying investment to give laying hens about three times a week of such food. Be sure to obtain a good grade of scrap, for if you use the fresh meat, cooked, it must be fresh and not old or putrid.

If it is desirable to feed animal food in the form of a mash, use the beef meal; use the scraps as dry food. Good beef scraps should contain about 50 or 60 per cent protein, never more than 15 or 20 per cent fat.

About the best and cheapest mineral food obtainable is crushed oyster-shell. Do not, however, make the mistake of using the for grit. Do you know that small, round smooth stones or pebbles are not grit? Use hard, rough crushed stone or broken crockery, something to act as teeth for the fowls to grind up their food. If the fowls run at large they will find grit, but if confined, it must be supplied to them, for it is indispensable to their good health.

POULTRY YARDS.

The fruit grower can get along very well without a poultry yard; but he can get along better if he provides at least two small yards about the poultry house. There are always chickens to be shut off from others nearly all through the year. When once you have provided yourself with an extra enclosure or two, you wonder how you ever got along without them and will be inclined to add a couple more.

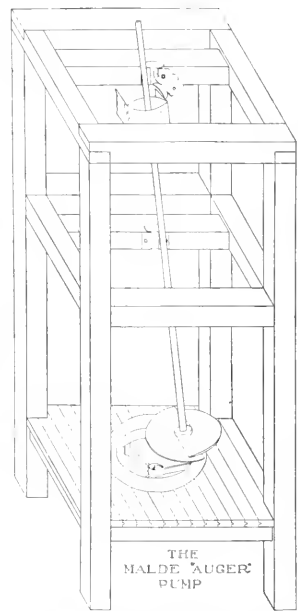
FEEDING CLOVER TO POULTRY.

Use second-growth hay, cut into very short lengths, one-quarter inch if possible. Scald and let stand until next morning. Add a teaspoonful of salt to every gallon of water used in moistening the clover. Before feeding, sprinkle with a mixture of bran, turning over occasionally until the whole is well mixed with the grain food. Fowls will eat this readily and it will prove an excellent change in the diet.

DESTROYING REFUSE.

Refuse material that is taken from nests should always be destroyed by fire. Nests are the real breeding places for lice when kept at

Irrigate and Drain Economically



The "MALDE AUGER PUMP" is the most efficient large capacity pump on the market. Capacities up to 11,500 gallons per minute or 25 acre inches per hour. For particulars, write

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Baby Chicks from the Famous O. A. C. Strain

Eggs from 221-egg hens mated to cockerels from 200-egg hens. All chicks tested and guaranteed free from white diarrhoea. Deliveries begin February 15, 1921.

PORTLAND SEED COMPANY
180 Front St., Portland, Oregon

the same temperature by setting hens and more should be fed three or four times a day on a clean surface which might be flat pieces of board. As soon as they appear to be satisfied, the surplus should be removed. This has particular reference to soft food. Ground oats or cracked corn may be left where the chicks will have access to it at all times, but not on the ground.

FEEDING THE YOUNG CHICKS.

After the chicks are a few days old, they should be fed three or four times a day on a clean surface which might be flat pieces of board. As soon as they appear to be satisfied, the surplus should be removed. This has particular reference to soft food. Ground oats or cracked corn may be left where the chicks will have access to it at all times, but not on the ground.

MILK FOR POULTRY.

Milk is a rational egg-producing food and should be liberally given wherever it can be cheaply obtained. Any kind of milk, whether fresh or sour, or clabber will do for the hens. They will drink it when set before them, or it may be put in a soft food, adding a tablespoonful of soda to every quart of milk.

Rats are always a pest about the barns and poultry houses, but they are a real menace during the baby chick season, for they take their toll of the youngsters each spring. Poison bait is said to be the best way to deal with the rat. But they are very cunning and soon learn to avoid any kind of bait and, therefore, several quite different kinds should be used in rotation, a grain, a meat, a cheese and a vegetable for instance. The U. S. Department of Agriculture recommends barium carbonate for poisoning bait. This is very poisonous to children and domestic animals and must be used accordingly.

The Oregon Poultry Producers' Association has recently been organized under the name of the Pacific Poultry Producers, and will operate in Washington as well as Oregon. Anyone who can ship at least one case of eggs a week through the summer should join. There are already more than 160,000 hens signed up, and it is expected that 200,000 will be represented. The association is in a measure co-operative and plans to prevent the market from being flooded at any time, and to maintain fair prices. The association claims to return to the producer 85 per cent of the selling price, instead of the 62 per cent he would receive from the speculator.

Give the setting hen a quiet, dark place in which to sit. She will come off once a day and will return to the eggs before there is any danger of their becoming chilled. Some dry place nearby should be provided in which she can take a cleansing dust bath. Fresh, clean water should also be easily in reach. Do not handle the eggs more than necessary. If one becomes broken, the others should be taken out and sponged off with warm water. Soiled nesting material should be replaced with fresh.

Cockerels from January and February hatches, if caponized in April and May, and turned into the orchard in June, where they can get plenty of green feed, will make a very fair substitute for the turkey for the Thanksgiving and Christmas dinners. If well fattened, they should weigh 8 to 10 pounds and better.

Better results are obtained when fowls are fed according to appetite than according to rule. There are no best poultry feeds or rations except those that supply the necessary food elements most economically. Hens cannot do well on a whole grain ration.—*Poultry, O. A. G.*

Above all else keep the hen houses clean and dry, and the fowls free from insect pests. If clean and dry with ample food, they can stand a great deal of cold, though in very extreme weather an ordinary lantern hanging in the house will keep them in better condition.

Fowls should have their breakfast as soon as they leave the perches in the morning. To insure this, it is best to scatter the grain in the litter the night before, after they have gone to roost.

A hundred and fifty hens of the right strain and breed and under proper care, can be made to produce from \$900 to \$1,500 per year. That would be a fair profit for an acre of apples to show.

To produce fertile eggs for setting, better results are obtained by mating cockerels to hens and older birds to pullets.

Provide your hens with sprouted oats, one of the necessities for insuring winter eggs. A grain sprouter can be purchased at moderate cost and will soon pay for itself in healthier, more contented hens, and consequently greater egg production.

Now is the time, while you have time, to get out the nail kegs or boxes you will use for the setting hens and give them a thorough coating of whitewash that they may be ready for the first hen that shows symptoms of being broody.

Remember that scratch feed alone is not sufficient to produce eggs in the greatest numbers. Keep your laying stock indoors where they are warm and dry, and see that they have plenty of dry mash to go to at all times.

Do not overlook the grit, oyster shell and charcoal. They are all absolutely necessary to egg production.

Examine the birds, roosts and nests for the tiny, though voracious, red spider. There is no pest which will pull the hens down more than this. Look for it particularly under the wings. Carbolicum or similar substance should be used freely in case of infestation.

Two-by-fours make better perches than round poles. They should be placed with the 4-inch surface uppermost, as hens rest, not on their legs, but on their breast bones, which will not become crooked when resting upon this wider surface.

Just as important as selected, true-to-name nursery stock, are eggs or baby chicks from proven laying strains. Do not keep a flock of scrub benders, but get good stock and they will amply repay you.

There is 75 per cent water in the egg. At the price of eggs, we wonder if the 75 per cent is not something else.

Traung Service helps create a new member of the BLUE RIBBON family



"BLUE RIBBON" products justify a blue ribbon carton, hence the design and manufacture were entrusted to us. Blue Ribbon Figs will sell big because the package bespeaks their goodness in an appealing way.

Traung Labels and Cartons measure up to your product. Traung service is specialized. All of our ability is concentrated in producing better labels and cartons. Let us do it for you.



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We specialize on standard apple boxes, crates and cases of selected material and carefully constructed.

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Lafayette, Oregon.

CHOICE strawberry plants, interesting prices. Oregon, Marshall, Magoon, Trebla, Eltersburg No. 121, Wilson, gold dollar, Progressive Everbearing. 100 each of any four varieties, \$4.75 postpaid. Postal brings price list and descriptions. Ward K. Richardson, 2379 Front Street, Salem, Oregon.

BERRY PLANTS DIRECT FROM GROWER—Loganberry, Cuthbert Raspberry, Trebla, Oregon and Wilson Strawberries, and other best varieties. Priced right and plants dug when ordered. Write Paul P. Burris, 1279 N. Sumner St., Salem, Oregon.

CORY Thornless Mammoth blackberry, originated here at Mountain Pass Ranch. Strong plants, \$3 dozen, postpaid; also Phenomenal, Loganberry, Gooseberry, Currant and Giant Crimson Rhubarb. G. S. Willis, Jamestown, California.

CHOICE Loganberry tip plants direct from largest producing section. Write for interesting prices on quantity wanted and free cultural information. Per 100 postpaid \$6. Ward K. Richardson, 2379 Front St., Salem, Oregon.

STRAWBERRY plants; rigid inspection guaranteed. Progressive Everbearing, \$1.50 per 100 prepaid. Oregon Improved, Magoons, Wilsons, Gold Dollars, Premier, \$5 per 1000. J. W. Vinacke, Canby, Oregon.

FOR SALE—Cuthbert and Antwerp Red Raspberry plants, \$15 per 1,000; Marshall and Magoon Strawberry plants, \$8 per 1,000. Oscar Hovey, Summer, Washington.

STRAWBERRY plants, 100,000 Gold Dollar and New Oregon, \$5 per 1,000; Cuthbert and Marlboro Raspberry plants, \$2.50 per 100. Lawson Nursery, Gates, Oregon.

LOGANBERRY plants for sale direct from the grower. J. P. Aspinwall, Brooks, Oregon.

STRAWBERRY PLANTS, \$5 per 1,000. Briggs Fruit Ranch, Olympia, Wash.

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MEN with proven ability capable of selling a line of high grade nursery stock on a commission contract. Weekly cash advance. Splendid territory may be had by answering immediately.

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BETTER ROOT VALLEY, MONTANA.
Bearing commercial **McINTOSH** orchards can be bought from \$200 to \$500 per acre, with fine improvements. Climate and all living conditions ideal. Write for **FREE** illustrated booklet.

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CALIFORNIA farms near Sacramento for sale; easy terms. Write for list. E. R. Waite, Shawnee, Oklahoma.

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DON'T WAIT! November is mating time for geese. I'm offering young breeding stock from my prize-winning Toulouse geese. Females \$6; males \$7.50. White Pekin ducks from imported stock; large, thrifty best obtainable. Ducks \$4.50; drakes \$5.50. R. E. Baumgardner, Wenatchee, Wash.

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KENTUCKY'S extra fine chewing and smoking tobacco. Aged in bulk, 2 years old; nice and mellow. Long silky leaf; best grade, 15 pounds, \$6.80; second grade, 10 pounds, \$4 postpaid. Satisfaction guaranteed. Reference, First National Bank, Bardwell. Adams Brothers, Bardwell, Ky.

FOR SALE—One good as new 24-inch low lift centrifugal pump, capacity 14,000 gallons per minute, with two 14-inch suction pipes, 16 feet long and one discharge pipe 10 feet long. Price f.o.b. Sturgeon, Idaho, \$1,000.00. J. J. Satre, Post Falls, Idaho.

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PRACTICAL fruit man wants position, care of orchard; wide experience; 12 years field work and packing. Married; best of references. Address Dept. G, care Better Fruit.

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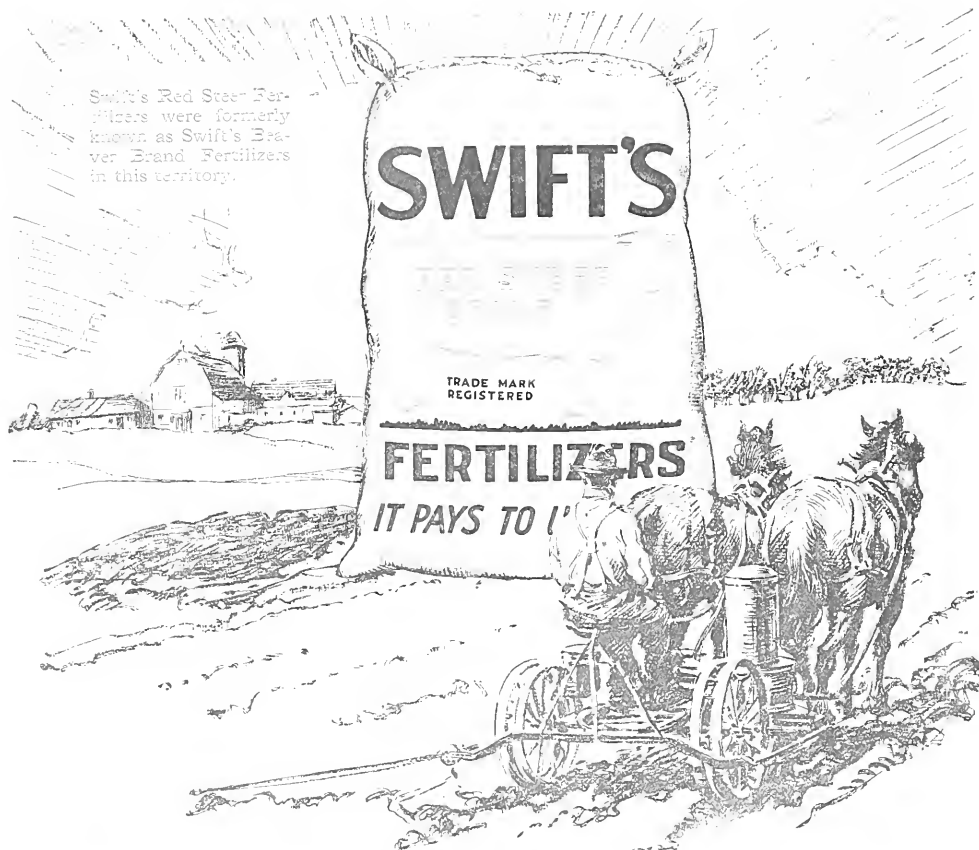
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Your crop cost will be low

MAKE your land yield more bushels of wheat, oats or corn per acre. Make the output per man greater. That is the way to grow your crop at low cost.

The certain way to insure large yields of best quality, which means low production cost, is to supply the crop with plenty of available plant food.

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Swift's Red Steer Fertilizer is evenly mixed and thoroughly cured and supplies each plant with its proper proportion of plant food, thus insuring large yields.

Liberal applications insure biggest crops of best quality.

For more than fifty years Swift & Company has maintained a reputation of making each Swift product the best of its kind, and the demand keeps growing for Red Steer Fertilizers, necessitating our building three new factories last year.

You can get Swift's Red Steer Fertilizers from the local Swift dealer or our nearest Sales Division. Don't delay—order and haul now.

Swift & Company, Dept. 532

(Fertilizer Department)

North Portland, Oregon

More per acre

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Your safest way to insure profit is to use a liberal application of Swift's Red Steer Fertilizers containing 14% or more of plant food.

" IT PAYS TO USE THEM "

BETTER FRUIT

VOLUME XV

MARCH, 1921

NUMBER 9



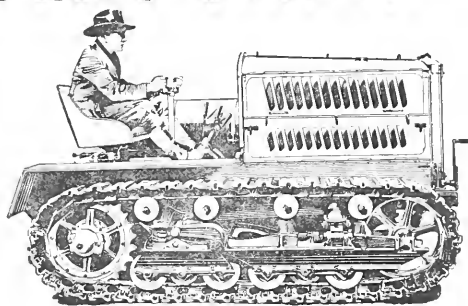
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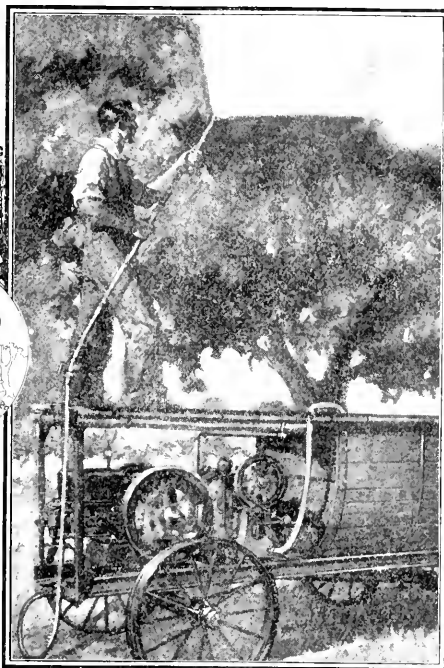
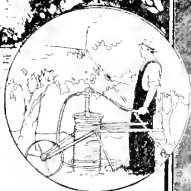
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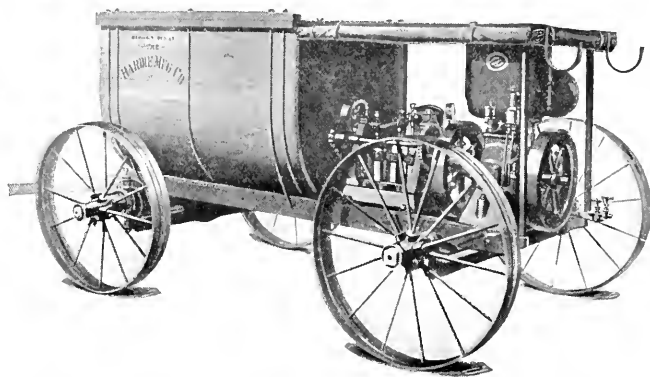
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Cherry Insects and Their Control

By A. L. Lovett, Entomologist, Oregon Experiment Station

OF THE insects which attack the cherry, there are none of such outstanding importance as to be generally recognized or as to prevent the development of a fair crop of fruit from year to year. As a rule, cherry growers practice no definite spray program for insect pest control. Nevertheless there are a number of fairly serious pests that prey upon cherries. Occasionally sprays must be applied for their control or serious losses result. It is a reasonable conclusion that the adoption of a more comprehensive spray program would be most decidedly profitable for the majority of the growers.

The Cherry Maggot.

The fruit of our late varieties of cherries, when ripe, if permitted to remain on the trees for a short time, or where held in storage often develop an inconspicuous shrunken brown area on one side. An examination of the interior of the fruit reveals a plump white maggot within the decaying pulp, usually located near the pit. This maggot is the larva of the cherry fruit fly or the cherry maggot.

Seasonal Injury.

The cherry fruit maggot passes nearly ten months of its existence in the soil as an inconspicuous brown, capsule-like puparium. The adult fly emerges from the soil about the time the cherries begin to show color (June 5 to 20.) They are rather small, light brownish flies with conspicuous black bars across the wings. They "sport" about on the foliage of the trees for about ten days lapping up droplets of dew. Later they begin egg deposition. The eggs are placed under the skin of the ripening fruit. The maggots, upon hatching, tunnel through the pulp, finally locating near the pit. They mature in three weeks or more, leave the now decaying cherry, drop to the soil and transform again to the brown puparium.

Varietal Susceptibility.

All varieties of cherries are attacked. The later black varieties of sweet cherries as the Late Duke and Lambert and seedling varieties are most heavily infested. Often infestation is as high as 30 to 90 per cent of the crop. The earlier white-meated varieties are much

more generally infested than is supposed. In the normal season, these cherries are picked before the maggots attain any considerable size and in the white meat are so inconspicuous that their presence is not readily detected.

Control.

Excellent results have been obtained in the use of sweetened poisoned sprays for the adult fruit flies. These sprays should be applied as soon as the adult flies appear. It is necessary, therefore, to make occasional field observations during early June for the presence of the adult fly. (See figure 1.) A second application should be made about ten days after the first, or even earlier if rains destroy the efficiency of the previous spray.



Fig. 1. Adult cherry fruit fly, showing characteristic banded wings.

Sweetened Poisoned Spray.

Lead Arsenate.....	3 pounds
Cheap Molasses.....	2 gallons
Water	50 gallons

Apply as a fine misty spray to the outer foliage. Use about a quart of solution to the tree.

Limited tests and the experience of some commercial growers in the Cove district of Union County indicate that the regular arsenic sprays 2-100 as applied for the cherry slug, when applied during the active period of the adult fruit flies, are very effective in the control of the maggot.

The Shot-Hole Borer.

It is the exceptional cherry orchard, probably, in which from time to time an occasional tree does not develop a severe case of shot-hole borer infestation. This condition has been particularly common during the past three seasons, following a series of adverse climatic factors which tended to devitalize the orchard trees.

Description and Seasonal History.

The shot-hole borer passes the winter as an adult beetle in tunnels formed the previous season in the tree. The females become active in the late spring and

seek suitable trees for attack. They tunnel into the tree for a short distance and then commence the formation of side galleries. The side galleries are used for egg deposition. The beetles later plant spores of the "Ambrosia" fungus, the material upon which the larvae feed and then proceed with the formation of other similar side galleries. One beetle will prepare a number of these galleries extending the main tunnel as required.

The larvae feed upon the "Ambrosia" beds of fungus growing in the galleries. They require about four weeks to grow to maturity. Successive broods as produced by the adult female continue to mature during the season. The grubs later become quiescent and transform to adult beetles in the tunnels where they remain until the following spring. There is but a single generation during the year.



Fig. 2. Shot-hole borer injury to twig.

The Injury.

Apparently vigorous trees suddenly exhibit signs of devitalization. Usually the whole tree is affected, though the attack may be confined to one side of the tree or to a single limb. An examination of the affected trees disclose numerous small shot-hole tunnels in the bark. Upon examination, a small, blackish-brown, bluntly built beetle is found within the tunnel. The combined attack of numerous beetles with their tunnelling tends to girdle or seriously weaken the tree. Heavily infested trees exhibit serious symptoms. The foliage becomes yellow, the forming fruit shrivels and often the infested trees succumb to the attack.

Only Devitalized Trees Attacked.

Careful studies have proven conclusively that this serious pest does not breed successfully in normal, healthy trees. The beetles are attracted to and breed successfully only in devitalized

46381—BetFet—2-24-21—J Galley 2 trees that have developed sour sap. Trees injured from any one of a variety of causes, the most common being winter injury, are the inviting host for this borer.

The larvae, contrary to the general rule of similar forms, do not tunnel in wood. They belong to a group termed "Ambrosia Beetles" and feed only on Ambrosia fungus planted by the adult beetles. This fungus grows in the presence of sour or fermented sap.

Control.

Discover the initial cause of the de-vitalized condition of the tree if possible, be it winter injury, poor drainage, root injury, need of irrigation or otherwise. Practice such measures as are most needed in the way of fertilizers, improved cultivation, irrigation, drainage, etc., to revitalize the trees. Paint the infested trees in the spring covering the infested portions only with the following:

Water	3 Gallons
Soft soap or liquid fish oil soap.....	1 Gallon
Crude carbolic acid.....	$\frac{1}{2}$ Pint

Apply when infestation is first observed and repeat at weekly intervals until three treatments have been given.

The Cherry Slug.

The cherry and pear slug occurs as slimy, greenish-brown, mollusk-like larvae on the foliage of both pear and cherries. They cause a typical skeletonizing effect of the foliage. The adult of the slug is a small robust, wasp-like insect, known as the saw-fly.

Seasonal History.

The winter is passed in the soil. The adult saw-flies become active in late spring and deposit their eggs within or between the two surfaces of the leaf. The ovipositor of the female is peculiarly modified for slitting the tissues for the purpose of egg laying and it is due to the presence of this saw-like organ that the insects get the name of saw-fly. The young larvae on hatching attack the surface of the leaves, feed voraciously and are mature in about 25 days. They drop to the soil, tunnel in and pupate and give rise to a second generation of slugs during August and September.

Control.

Spray for the pest when it appears. Regular lead arsenate sprays, 2-100 are effective and probably advisable for a large acreage. Finely divided dusts of any sort are excellent as a contact spray. Road dust, ashes, sulphur or the orchard dust sprays prove very effective.

The Black Cherry Aphis.

The cherry aphis is of wide distribution and general prevalence in the Northwest. The masses of curled and distorted foliage on the terminal branches, the typical evidence of aphis attack, is a common and disgusting sight in our orchards.

Description and Seasonal History.

The aphids are the usual soft-bodied, long-legged, plant louse type, mahogany brown in color, robust and active. They



Fig. 3. Twig of cherry showing rolled and distorted foliage due to attack of cherry aphids.

pass the winter mostly as eggs on the cherry tree. These eggs hatch in the spring. As with most plant lice all of these forms are sexual females having the unique ability to give birth to living young. The true sexed forms appear only in late autumn. After the earlier generations both winged and wingless individuals occur. The rate of increase is enormous and the foliage of the affected trees soon develops the typical curled and distorted appearance, the interior of the crumpled leaves bearing a mass of aphids, honey dew, lady birds and ants.

The winged aphis produced in the colonies may migrate to other trees, though generally in mid-summer the

majority of the cherry aphids desert the cherry and fly to the shepherds purse where they continue to feed and reproduce until early fall. They return to the cherry tree in the fall, the sexed forms develop, eggs are deposited, and so the winter is passed.

Ants and Aphids Cooperate: A very interesting relationship is found between the cherry aphids and their attendant ants. In the fall of the year as adverse climatic conditions develop, the ants collect some of the cherry aphids and probably their eggs as well and transport them to their colonies. Here the aphids are maintained until the following spring when the ants return them to the foliage of the cherry. They guard the aphids from their natural enemies, attending them carefully until the colonies of aphids develop to a considerable size. For this service they receive or appropriate in return the honey dew which the aphids secrete.

Control.

The regular contact sprays as applied generally for aphids will control the cherry aphids if the spray actually wets the insect. The difficult thing is to wet the aphids in the curled leaves. This same handicap is evident in an attempt to spray (except at the proper time) for most of the orchard plant lice. The standard aphid spray for orchard conditions and of equal merit for the cherry aphid is lime-sulphur 5-100 plus Black Leaf 10, three-fourths of a pint to the hundred gallons. This should be applied as a delayed dormant spray or just as the buds are bursting well and before they are open.

Use Tangle-Foot Barriers: The ants tend to reinfest the tree with aphids subsequent to the application of the standard aphid spray. To prevent this, in connection with the spray, apply some mechanical barrier about the trunk of the tree to shut out the ants. Bands of tree-tanglefoot about three-fourths of an inch wide are very satisfactory. Bands of cotton batting or other mechanical devices may be used. This treatment in conjunction with the spray application is very necessary.

To thrive properly grapes require a well-drained soil of good fertility.

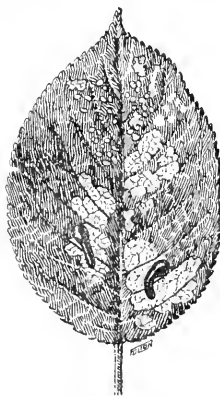


Fig. 1. The pear and cherry slug on foliage.

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Peach Growing in the Pacific Northwest

WITH the many processing plants that have been established throughout the Northwest the possibilities of a greater development in peach growing are being emphasized with a view to having the peach take its place in this section with the greater growth of other fruits.

Many sections of the Northwest are especially adapted to peach growing and with adequate marketing facilities peaches are a very profitable crop.

In growing peaches in this region C. I. Lewis who has investigated the matter says in part:

"Generally speaking peaches prefer a light, sandy loam. Many of the volcanic ash soils of the Inland Empire are ideal. In Southern Oregon we find that the granite soils of the hills are the best, while in the region west of the Cascade Mountains the sandy loams of the river bottoms should be selected. Occasionally the red-shot hill lands of the higher exposures of the valleys are good.

"The proper elevation at which to grow this crop is largely relative. In a general way the lower elevations are to be preferred, as they are apt to be earlier and nearer good shipping facilities. In the western part of Oregon we find that peaches should be grown either at the lower elevations or else at a fairly high elevation. That found in between is often more exposed and subjected to frost.

"The peach is an early bloomer and is therefore often caught by frosts that would not damage to any extent the apple or pear crop. One should avoid draws where cold air settles. In frosty regions the northern exposures are apt to be better than the southern. Large bodies of water, such as lakes or rivers, exert an influence. We notice this particularly in the case of the Columbia

and Willamette, the regions in close proximity to these rivers being less frosty. Good air circulation is an essential of successful peach growing. The site should also be near good marketing facilities, as the peach is a very perishable crop.

"Before planting the ground should be given thorough preparation, much as is practiced with other fruits. Occasionally peaches are grown successfully in Western Oregon on land that has not been entirely cleared, some of the stumps being allowed to remain to rot while the peach orchard comes into bearing. Probably the early spring months, such as March and April, are to be preferred for planting. Give your trees plenty of room. You want a broad, spreading tree instead of a tall, rangy one. Many growers who formerly planted 12x12 are now allowing 20 feet for the tree.

"The budded one-year-old trees are to be preferred, as they adapt themselves to conditions more easily and give the grower a chance to start his trees low, with well formed heads. As regards variety, the number grown at the present time is rather limited.

"No one phase of peach culture is so neglected as the pruning. We must start with the one-year-old tree. This is generally topped at about fifteen inches from the ground and the head in some cases formed as low as eight or nine inches. The present tendency is toward lower heads. Vigorous trees that have not been exposed to hardship can be trained to a whip, but where there is some doubt as to their growth it is sometimes advisable to leave one or two buds on the small laterals. At the end of the first year it is advisable to select from three to five of the best branches, and remove all the remain-

der. Cut back these frame branches from ten to twenty inches, according to conditions. In the selection of these branches you should keep in mind that a broad-spreading tree is desired, and the pruning the first two seasons should be with this view in mind, coupled with the fact that you must also have strength if the tree is to bear large crops. After the framework is well formed the aim should be to develop as much strong bearing wood as possible. The fruit is always borne on the one-year-old wood. The fruiting wood at the lower and inside portions of the tree is liable to die out, unless care be taken to thin out where the growth becomes too heavy, and to head in somewhat to force out new lateral growth. Wherever trees tend to become too rangy head them back. This may be at the expense of some fruit, but the peach naturally tends to overbear. In years of no crop the peach grower has a fine opportunity to head back rangy trees and produce an abundance of wood for the next crop. Rather old trees that have been neglected can be rejuvenated by removing practically the whole of the top, cutting back the main branches to stubs. In two years a magnificent top can be developed.

"Cultivation should be very thorough in the springtime. Where irrigation is not possible this intensive cultivation is generally necessary up to the time of maturity of the crop. There is a danger at times in cultivating young trees and sometimes bearing trees too late into the fall, thus not allowing the trees properly to harden so as to ward off winter injury. With irrigation the same rule applies. A tree should never be allowed to suffer for water; at the same time the water should be so applied that for a period of three weeks during the maturity of the fruit no application of water will be necessary, as too much water at this time will result in a large, coarse peach which is watery and insipid and of poor shipping qualities."



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"Pedigreed" Trees—Where Do We Stand?

By A. E. Murneek, Assistant Professor of Horticultural Research, Oregon Experiment Station

(Continued from February Number.)

THERE is no limit to the number of fluctuating variations. All characters of the tree and fruit are subject to fluctuations. It is one of the means of adjustment of the organism to gross changes of the environment. It may sometimes express itself, in extensive regional variations or fluctuations of one or more characters of a variety. The eastern varieties of apples, for instance, when grown in the west assume a different, generally more oblong form. The soil, atmospheric conditions, cultural practices, such as pruning, fertilization, spraying, irrigation, may cause marked fluctuations from the average of trees in a whole region, an orchard, the individual tree, or only a part of the tree. Most probably the effect of food supply would be of prime importance as a factor causing fluctuations. Thomas A. Knight, the eminent English horticulturist, recognized this fact when he said that "Nutrition reigns supreme in the whole realm of variability." So, too, Darwin was of the opinion that "of all the causes which induce variability, excess of food is probably the most powerful." The complexity of the situation becomes at once evident when we consider that frequently more than one and often all of the factors enumerated above may be the direct or indirect causes of this type of variations. Moreover, it may exhibit itself in varying and changing degrees.

Fluctuating variations as a rule are extremely seldom if ever inherited, that is, they may not be perpetuated either sexually through the seed or asexually through cuttings or buds. Any attempt to propagate by means of buds, a tree that is bearing particularly heavy crops, or well formed or highly colored fruit, if these characteristics have been brought about and maintained by favorable environmental conditions and hence are of a fluctuating nature, would be of no avail. Neither the output of an orchard nor a particular strain or characteristic of the variety may be accentuated or established by this practice. For the sake of emphasis may it be repeated once more that such variations or fluctuations are not transmissible.

This permits us to explain why bud selection experiments of the agricultural experiment stations, as stated previously, have given almost invariably negative results. As an example, trees propagated from heavy and light bearing Ben Davis at the Missouri Agricultural Experiment Station did not come true to the parent plants—the bearing habit was not transmitted. Likewise strawberries propagated by means of runners (buds) for ten generations at this station, gave the same results—the offsprings from high yielding plants were no more productive than those from parents with a low record of bearing. Moreover the variations exhibited by the two would-be

strains were just as great as in the original stock. Similar negative results with strawberry selection have been reported from other stations.

Recently a full account has been published of exhaustive apple-bud selection investigations of the University of Illinois Agricultural Experiment Station. Buds from twenty-one varieties were used in connection with this work. They were chosen in regard to their size and location on the tree. It was found most conclusively that, for purposes of propagation, there is no difference between buds of large and those of small size. Neither does it make any difference from what part of the tree the buds are taken.

So much for fluctuations. Another type of bud variation is, however, not infrequently exhibited by plants. It differs most distinctly from ordinary modifications or fluctuations, though a strict line between the two is often difficult to draw. In horticultural literature variations of this character are known as "bud segregation," "vegetative mutation," "bud sports," or simply "mutations" or "sports." For the sake of clearness and brevity let us call this type of variations true "variations" or "mutations." In cases of mutations the internal or genetic constitution of the bud has changed. The "blood" of the tree or branch is different, the external environment, the orchard practices, having very little, if anything, to do with this striking and permanent change in the plant. May it be remembered here that fluctuating variations on the contrary are caused solely by environmental differences.

A word as to the frequency of bud mutations. In Coleus, a greenhouse plant, it has been found that one true but variant may occur in from 500 to 20,000 normal buds. While in cases of other plants, like the potato or tobacco, it may be as rare as one in 200,000

plants. It is not known how often bud variations are exhibited by deciduous trees, the apple for instance. We can assume, however, that they may be as infrequent as in the instances cited. Dorsey tabulated the parentage records of 2,664 leading varieties of apples, cherries, grapes and plums and found only five cases of origin from true bud variations ("sports").

Bud mutants are of the greatest importance to both horticultural science and practice, for (1) they are often inherited and hence are transmissible by seeds and (2) in most instances they may be established and propagated by vegetative means, such as cuttings, grafts, buds, etc. This type of variation or mutation may establish a strain or a new variety and may increase the output of the orchard, if the mutation is in the direction of greater fruitfulness.

A large number of instances of true bud variations or mutations have been recorded, only a few of which may be mentioned here. Beach has described and named a deep-colored 20-ounce apple, which has been propagated asexually and is now known as Collamer. The heavy bearing Paragon is supposed to be a bud sport of Mammoth Black Twig. Kraus discovered a striped branch of Bartlett pear. It bears striped fruit and shows unmistakably the characteristics of a bud mutant. Yellow plums have given rise to fruit of red color. Purple grapes have produced green fruit. Shamel has described a new variety of the French prune, the Coates, which originated as a bud sport on the Petite. The existence of several distinct strains of Italian prunes has been mentioned. The nectarine originated as a bud sport on the peach. Many more instances of true bud variations resulting in increased size—or in differences in the form of the fruit could be cited. So, too, the time of



FIGURE 1. Apple trees are bench grafted before they are set out in the nursery row.

maturity and the quality of the fruit may be affected because of bud variations. Moreover, but mutations may occur in any part of the tree, though it may not be directly evident in the fruit. Undoubtedly the largest number of mutations are exhibited by the tree proper. But because of their lesser practical importance, they have escaped observation and reference.

It is of particular value to emphasize here that the productivity or performance of the tree may be determined in many instances by bud mutations. In respect to economic value, it may have worked in either direction—toward greater or lesser productivity of the tree. Shamel's work with citrus fruits, shows us quite clearly that here we have to deal with instances of real bud variations or mutations ("bud variations"—Shamel) that are of tremendous economic significance. Individual trees or whole orchards may have been propagated from buds that could have been called mutants or variants in respect to their bearing habits, which in many instances has been in the direction of lessened productivity.

Already as early as 1910 Coit expressed the belief that through unintentional propagation of undesirable sports, an increasing proportion of trees in citrus orchards of California are of the drone type. The investigations of Shamel tend to show that this most probably is the case with all varieties of citrus trees. It appears that because of convenience and economic considerations, bud-wood has been obtained from trees of low degree of fruitfulness. At least, some such trees may have come about because of bud mutations. These variations have thus been propagated bringing about the present condition.

The question now arises as to whether such a state of affairs could possibly exist in some of our deciduous orchards. At present there is no evidence to show that it does. In the first place, as already mentioned, deciduous fruit plants seem to vary or mutate far less frequently than citrus trees, though some varieties may do so more often than others. The Baldwin apple, for instance, is said to sport more often than most any other apple. Perhaps this is due primarily to the length of time this variety has been under observation. The whole Ben Davis group is supposed to be also in a state of instability. But as the question of new varieties is not of so great an interest as the increase in profitability of the orchard, the matter may be settled only by the keeping of extensive performance records of the individual trees. Will it pay to keep such records?

The meager evidence that we have from our experiment stations throws but little light on the subject. Data gathered for four years of the yields of 1,240 trees at the Virginia experiment station show that some 400 trees of this lot produced four barrels of fruit per tree, making up 60 per cent of the crop, while 200 other trees averaged less than a barrel per tree. Yield



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records of McMahon, Patten and McIntosh apples kept for 18 years at a Canadian station have given similar results. The most productive trees yielding about twice as much as the least productive ones. How much these differences in fruitfulness may be ascribed to environmental conditions, such as soil, moisture supply, etc., is an open question. But because of the frequency and importance of fluctuating variations we would be safe to assume that the environment is the main, perhaps the exclusive factor. Then, too, since the stock on which almost all of our fruit trees are grown is a seedling, undoubtedly this has a whole lot to do with these differences in performance of the trees. (The subject of the reciprocal influence of the stock and scion will be discussed in a subsequent article.)

Granting all this, we are still confronted by the possibility that the wide differences of productivity of our fruit trees may be due to the unintentional propagation of low producing strains—bud variations or mutations of an unproductive or drone type. Commonly trees that are shy bearers exhibit exceptional vegetative vigor. They produce good bud wood. They are tempting, convenient and adaptable for propagating purposes. It must be understood, however, that there is no information on hand that any such drone strains have been propagated and are in existence in our orchards.

Lacking such an evidence, what can the prospective orchardist do to safeguard himself against such a possibility? Lately there has been manifested a growing and persistent demand for the best, the most reliable trees. To meet it many nurserymen have been offering "pedigreed" trees, taking advantage of the meaning associated with

the term "pedigree." Some of such trees probably are no better than any other stock save perhaps that they have been chosen for their healthy appearance and size. Others have been grown from buds or scions obtained from trees that were thought to be superior in respect to general vigor of the tree and the quality and quantity of fruit they have borne.

May it be stated here that the term "pedigreed" is a misnomer. No tree can really be called pedigreed unless its genetic constitution or at least its vegetative parentage can be traced back for a large number of generations. It would be far more correct if such nursery stock, as Coit has suggested, should be known as "selected."

No absolute guarantee can be attached to trees selected in this manner. Though the parent plant from which bud wood was cut for propagation of the stock may be all that could be desired, there is no assurance that the offspring will be a chip of the same block. The good qualities and behavior of the scion tree may be due to the exceptionally favorable environment and good care to which it is exposed. In other words, it may have exhibited fluctuation that can not be propagated. Such trees, however, carry some assurance with them at least. They have not been grown from buds of an unproductive tree—one belonging to a drone strain. It is to the honor of many reputable nurserymen that they do select their bud wood with care.

It is almost needless to emphasize here that the roots or stock upon which the tree is grown undoubtedly has frequently a decided influence upon the behavior of the tree. Witness the dwarfing of a tree if grown on certain roots and the performance of the latter to various soil conditions. The Illi-

nois bud selection experiments show us that the stock used reflected in some degree on the scion grafted on it. The little roguing that is practiced by nurserymen in selecting roots for grafting or budding purposes is largely in respect to vigor of growth. We know next to nothing about the compatibility of various stocks to the scions or buds set on them.

Any grower contemplating the setting out of an orchard should exercise the greatest care in buying his trees. He should verify the reliability of the nursery and assure himself of the absolute health and high degree of vigor of the nursery stock. Then one must always bear in mind that the early neglect of a plant is often very telling upon its subsequent behavior. The young trees, while grown to perfection in the nursery, are often put under the most trying conditions in the orchard. Frequently enough they are entirely forgotten and left to struggle for their very existence.

In the meanwhile may it be hoped that further and more extensive investigations respecting bud selection and tree performance of deciduous fruits, more or less similar to the work done by Shamel may throw additional light on the subject. The fruits of the Northwest have always been conspicuous for their quality. Anything below the C grade was frequently seen rotting on the ground. With the advent of the fruit products plant the quantity of the crop is, however, beginning to count more and more.

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PORTLAND, OREGON

Fertilizer for Orchard and Bush Fruit

By Gordon G. Brown, Hood River Experiment Station



Gordon G. Brown

THE time is rapidly approaching when the fruit grower must apply his fertilizer. The aim of this article is to assist the grower to decide in a ample time what practice he shall adopt in order that his requirements may be provided for.

For the Apple Grower.

It must be made plain to the apple grower at the outset that the only fer-

tilizer from which we have had any appreciable response has been nitrate of soda or some other fertilizer high in nitrogen. On a limited scale, experimentally we have had equally good results from sulphate of ammonia.

It is impracticable to attempt to lay down any blanket recommendation for all growers. Obviously, the age of trees, character of soil, previous culture methods, pruning, cover or shade crops, fertilization previously practiced must be carefully considered before any rational plan may be submitted. However, for the sake of argument we will

Continued on page 23.

Invigorate Your Orchard

The damage done by last winter's frost can be repaired. Your orchard can be invigorated and built up by scientific methods.

FERTILIZE WITH Nitrate of Soda (CHILEAN)

Consult your nearest government experiment station or county agent as to its application and the results you may expect.

For literature and price write or wire:

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Take Care of Nursery Trees

Large numbers of nursery trees, especially fruit trees, either fail to grow or are badly set back by carelessness and delay in planting. Such trees may have been well grown and vigorous in the nursery, and may have been well protected in winter, packed carefully, and shipped promptly, but are so poorly handled before planting that they are seriously damaged. In many cases the blame that is laid on the nurseryman is really the fault of the buyer and planter. The Bureau of Plant Industry, Pennsylvania Department of Agriculture, gives the following points regarding the treatment of nursery trees so as to obtain the best results.

(1) As soon as received examine the roots to see if they are still moist. If not moisten them immediately and keep them so until they go into the ground. Never allow the roots to dry out even for a few minutes.

(2) If the trees cannot be planted immediately heel them in by digging a shallow trench and covering the roots and lower stems with moist earth.

(3) Just before planting prune both roots and tops. Take away most of the fibrous roots which are likely to be dead and useless. Cut such small rootlets near the larger roots with a clean cut. Always trim the roots with a slanting cut on the under surface to hasten rootlet growth.

Prune the top to a single whip and shorten it so that the top will make a trunk of the desired height. After growth is well started pinch or rub off all but the three or four shoots that will be needed to form the main branches of the tree.

(4) The soil should be loamy and loose so as to allow the new rootlets to reach said food very quickly after they are formed.

(5) Plant a few inches deeper than the tree stood in the nursery. The hole should be large enough to contain the roots in their natural position without bending or crushing.

(6) Do not merely fill in the hole after the plant is set and tramp the earth about the surface. First add some top soil and pack it firmly, then add more and tramp this in, and so continue till the hole is filled. This careful packing is needed not only to bring the roots in close contact with the soil and thus give the reduced root system every opportunity to absorb water, but it also helps to hold the plant firmly in a correct position till the new root system can obtain a secure hold.

(7) If by any chance the trees arrive in a badly dried out condition bury them in damp but not wet earth and leave them in the ground for four to seven days. This will bring them back into condition and may save a heavy loss to the buyer.

Never has the demand for berries for market been better than at the present time. While there has been some difficulty in marketing other fruits berries have more than held their own with the result that there has been a greatly increased planting.



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From Bag to Fertilizer Distributor

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Then think of having a fertilizer which contains one-third more ammonia (one-third more active plant food) than any other nitrogenous top-dressing.

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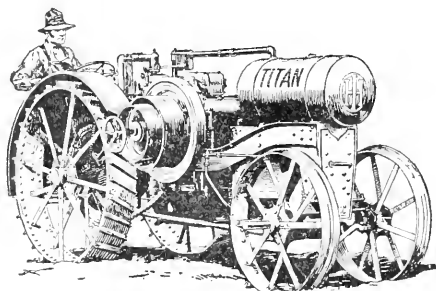
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Theories and experiments in design and construction run their course among manufacturers and among farmers—and leave behind a varied history. But the service record of Titan has been a revelation in the agricultural world. Its record as an efficient farm power unit has been, to state a plain truth, *convincing*.

During its history, Titan sales have swept ahead; this tractor has carried its success into every county and country. Yet, except for minor improvements and betterments, Titan design has remained unchanged. It has stood the test of time, the test of hardest, roughest usage, the test of strenuous competition, so that to date the farming world has invested over seventy million dollars in Titans. Can there be better proof of thorough practicability?

Titan 10-20 is now more than ever *standard* because it is fundamentally simple, enduring, reliable, right. Do not be deluded by initial false economy. Increase the efficiency of your work for 1921 by an investment in this power. The International dealer is the man to see.

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Small Fruit Diseases and Their Control

By H. P. Barss, Plant Pathologist, Oregon Experiment Station

LOGANBERRY Anthracnose: Small spots with light centers and dark margins on canes and leaves. May attack fruit, causing discoloration and shrivelling of drupelets of berry. Drying up of fruit due to dry weather or lack of soil moisture, or root-cutting or borers may be mistaken for anthracnose effect. Caused by a fungus. Spread by spores produced in spots on canes and leaves. Favored by damp weather. Carried over on dead leaves and old canes. Control: Cut out old canes and badly spotted new growth immediately after picking. Spray with Bordeaux (1-4-50) with soap or other spreader (1) when first new leaves in spring approach full size; (2) just before bloom; and if necessary spray (3) about two weeks after petals fall with Burgundy (2-3½-100). If disease has been bad, spray new canes with Bordeaux soon after cutting out old growth in summer.

Bluestem of Black Cap: Dark discoloration of cane followed by wilting and drying up. Cause: A soil fungus which attacks roots and growing up inside canes plugs sap tubes. Spread in soil. Control: No preventive known. When started will gradually take whole patch. Growers must abandon old ground, starting new on healthy soil with sets from healthy plants in healthy fields.

Gooseberry Mildew: Whitish powdery growth on foliage and fruit turning dark brown. Ruins fruit. Worst on European sorts. Cause: A fungus which lives over winter on branches and within the buds and spreads on leaf and fruit surface like a mold. Spreads also by spores carried by wind, rain, insects, etc. Control: spray with lime-sulphur, 1 to 25 or 30 when first leaf clusters begin to open out. Cover everything all over. Spray again with lime-sulphur (1-40) just before bloom. Repeat if necessary. Bordeaux will not kill mildew. Dusting the bushes at intervals with the finest grade of dusting sulphur will also keep down the mildew.

Current and Gooseberry Anthracnose: Small angular leaf spots. Worst on current. May cause very severe dropping of leaves. Cause: A fungus spread by spores from new and old leaves. Control: Clean up or turn under old leaves before buds begin to open in early spring. Spray as for mildew, but follow fruit harvest at once by another spray, preferably of Bordeaux, 1-4-50. (Lime-sulphur burns worse as the hot weather comes on.)

Grape Mildew: Whitish growth over foliage and fruit. Causes stunting, distorting and hardening of fruit. Caused by a surface mold carried over on old leaves, canes, etc., and possibly in buds. Control: Dust thoroughly with dusting sulphur (finest obtainable). Begin when new shoots are 6 or 8 inches long and repeat at intervals. An application just before bloom is a good thing. Others should be given whenever inspection shows any live mildew anywhere.

Crown Gall: Irregular tumor-like swellings on roots or breaking out from canes. Caused by bacteria getting into wounds, mostly below ground. Spread from plant to plant by cultivation or pruning. Control: None. Pull out and destroy affected plants as soon as discovered. Before replanting remove infested soil and replace with good soil. Do not set out plants with suspicion of galls on roots or crown.

NICOTINE DUSTING.

The Bureau of Entomology, United States Department of Agriculture, has been conducting experiments with nicotine sulphate applied in dust form. Mixed with kaolin to give the poison bulk, 40 per cent strength nicotine sulphate did remarkable work in controlling melon, cabbage, and pea aphids, onion thrips, and western cucumber beetles. All these insect pests are hard to reach with ordinary sprays, but the floating dust settles upon the under side of the leaves as well as on the surface. The experi-

ments show that much larger areas can be treated in less time than is required by spraying. Moreover, the equipment necessary to apply the dust is much less expensive than a spray outfit and its cost of application is less than by the older method. It weighs less than spray and is more conveniently handled. It can be mixed with arsenate of lead or sulphur for use against insects and fungous diseases.

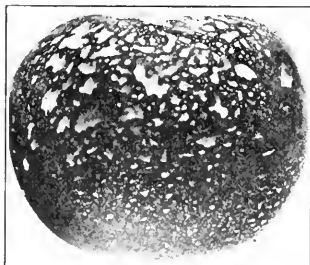
O. A. C. Experiment Station Notes

It is not economy to skimp in the use of spray materials in orchard insect and disease control. Growers whose reports show less than average spray materials per tree invariably report poor control and losses. Those that show a uniform usage throughout the season just as regularly report good results.

All brown rot mummies and dead spurs are removed in pruning stone fruit trees on the Oregon Agricultural College experiment station farm. Likewise all mildewed twigs are cut away in pruning the apple trees. A large amount of infection arises from these sources unless controlled when the trees come out in the spring.

Most plant diseases are more easily controlled if the host tree is pruned to thin out the top well, leaving such distribution of branches as favor entrance of sunshine and circulation of air. This type of pruning also makes spraying easier and more thorough, and allows the fruit and foliage to dry off more promptly, which hinders germination of disease-bearing spores.

This is the time to look over the harvesting equipment, for in thirty to sixty days the spring work will commence and from then on there will be no let up. Give all working parts plenty of oil. Tighten nuts, and replace any that are missing. Do not wait until you are ready to use it, do it now.



Arsenate of Lead 1-200
No Spreader

Spreader
THE PERFECT SPREADER

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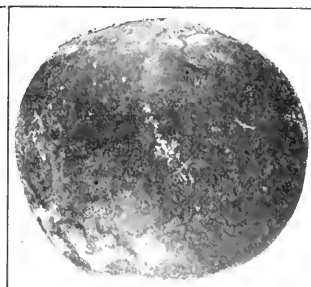
"SPREADO" increases the adhesiveness of the spray, especially desirable in rainy sections.

"SPREADO" increases the wetting and covering power of spray, more than paying for itself in the saving of spray materials.

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Twenty thousand discriminating families last year secured stock of us. This year our business is better than ever. "There's a reason," and that is the class of stock we deliver and the service we render.

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The Nursery Business

By C. A. Tonnison, Executive Secretary Pacific Coast Association of Nurserymen.

THE nursery business as it exists at the present time is a development of the propagation of trees and plants to meet the requirements of the domestic and commercial planters all over the country. In the early stages the nurseryman grew only a small block of the kinds of trees required in his immediate vicinity. Expenses were nominal, risks and hazards not considered. With the development of commerce the demand for nursery products expanded, orders coming from innumerable interstate localities and nurseries naturally became both manufacturing industries and selling concerns on an increasingly large scale.

It naturally transpired that a considerable number of the good propagators were not skilled in business matters and therefore unable to fill requirements of an efficient distributing system. Others knew how, also, to do the selling but were unable to handle properly both departments of the vocation. Many of those engaged in the work therefore, gave attention only to the growing and sold at low wholesale prices to parties who developed the business of selling and distributing. The result was that responsibility for an ideal product was not definitely fixed. In some cases unscrupulous distributors would buy from growers whose methods were more or less deficient, because their prices were lower than those of others who observed painstaking methods and in cases where these distributors did their own assembling and filling of orders, labels would sometimes get mixed. This created dissatisfaction on the part of planters and caused a reflection on the entire nursery vocation. In later years reputable nurserymen realizing that a reform was necessary have devised methods whereby the growing, the sale and distribution might remain under their control until the products were in the hands of planters. This reform has not been an easy job and considering the thousands of acres of commercial

orchards planted and the small percentage of mistakes which have occurred their endeavors show good results.

But for years previous and up to the world war the nursery business was hampered because of both indifference and ignorance on the part of some propagators as to the requirements and the actual expense incurred in the production of reliable products. This caused a selling price in many cases too low for the production of a standard and satisfactory product, the few cents thought to be saved by the buyer in reality causing him dissatisfaction.

At a recent meeting of the Pacific Coast Association of Nurserymen action

was taken to eliminate as far as possible, every element of inefficiency. A standard of ethics was adopted, now bearing the signatures of a majority of leading nurserymen on the coast and of some of the states east, which signifies all reasonable endeavor to conform to sound and approved methods and square dealing as implied in their trade mark, "Dependable Nursery Products."

This cooperative endeavor also includes a fight against unscrupulous schemes and fakers, and against carelessness in any matter that may work to the detriment of the valuable horticultural industries of this country.

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"HONOR-BILT"

"Make Profits More Certain"



SPRAYING is in order—Dormant spraying is already being carried on in many localities—soon will come the general activities now universally indulged in during bud and blossom time—following this, a repetition of the work during summer months completes the cycle of protection.

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Interplanting in the Orchard.

An announcement recently made by the United States Agricultural Department is to the effect that cotton as an interplanted crop is finding much favor in the San Joaquin Valley of California. It seems to be especially well adapted for use in first-year vineyards or in young orchards. In Department Circular 164, issued by the United States Department of Agriculture, a representative of the Bureau of Plant Industry reports that a Kern County farmer planted cotton between young apricot trees which were making their third-year's growth. From about two acres of orchard land he harvested nearly \$500 worth of cotton in 1918. The cotton plants occupied only 1.27 acres of the entire plot. In this instance the farmer was enabled to pay the upkeep costs of his orchard with the proceeds from his cotton and to pocket a good profit in addition.

Another farmer in the same county set out 12 acres of grapevines and interplanted with two rows of Pima (long-staple cotton) placed between each two rows of the vines. He obtained a yield of nearly a bale to an acre. At the end of the season his vines were in excellent condition, only one being lost in the entire lot. Specialists say the practice is a profitable one; the cotton is as good as when grown alone, and the young grapevines are equal in every way to those grown without an intercrop.

While intercropping has been practiced successfully and beneficially in orchards in many instances with such crops as alfalfa and clover we believe that care should be exercised in planting crops in orchards that are not legumes. The success of orchardists in California in planting cotton as an intercrop is interesting and proved profitable. The question, however, is how long will the soil of an orchard stand the extra drain from such a crop as cotton which requires a large quantity of plant food to mature properly. It would seem that continued planting of this or a similar crop in an orchard must result in affecting the growth or bearing qualities of the trees in a light crop of cotton or possible unprofitable returns from both.

The Importation of Fruit Pests.

Discovery of heavy infestations of brown-tail moth nests on fruit seedlings and of nests of the white-tree pierid on other shipments received from France have caused a general warning to be

telegraphed to state officials by the Federal Horticultural Board, United States Department of Agriculture.

The board expresses a fear that there has been laxity on the part of the French inspectors and urges careful and consistent examination of all shipments of fruit seedlings from France coming under state jurisdiction. The inspectors of the board at ports of first arrival make a superficial inspection of all foreign shipments of nursery stock to determine their agreement with the permit invoice and original certificate of inspection as to quality and kind of nursery stock, and as to compliance of the shipment with other regulations; but owing to lack of facilities and inspectors it is not possible to make the port inspection thorough enough to guarantee the exclusion of plant pests.

The French inspection service has been advised by cable of the condition of stock under their certificate arriving in this country, and a warning has been issued to French exporters and American importers. Experiments are under way in Boston to determine the possibility of killing hibernating brown-tail larvae by vacuum fumigation. In the meantime steps have been taken to have all French shipments given such fumigation as is now required for cotton. If vacuum fumigation will not kill all larvae contained in nests it may be necessary to cancel all existing permits for French stock. The board strongly recommends the burning of all packing material.

Inasmuch as there is a possibility of confusing the nests of the brown-tail moth and the white-tree pierid, it is suggested that, if there is any doubt as to the insect killed, it should be forwarded to the Federal Horticultural Board for determination by specialists, after steps have been taken to kill any larvae which may be contained in the nests.

Just what procedure will be necessary to destroy these fruit pests and safeguard the fruit industry of the United States can be safely left to the United States Department of Agriculture. One of the most important matters in connection with this work is that it shall have the cooperation of all interested in the fruit industry in order that this new menace may be effectually stamped out.

Optimism and a Clean Crop.

Misery loves company, especially when the company is more miserable than we are. A few quotations of prevailing prices in Havana may tend to make us more contented with our lot. Grapefruit sells at New York prices, though a few miles from the city they are left to go to waste. A good pair of men's low shoes are priced as high as \$28; flannel trousers at \$35; silk shirts at \$30, and \$8 for a cotton umbrella is considered cheap. Cigarettes which cost us 20 cents sell for 60 cents there, and for a \$2 box of American candy they ask \$7. For a fairly good suit of clothes, out of stock, the Havana merchant charges \$100; for women's wear it is even higher. Let us take

comfort from this comparison, and agree, each one to do his "bit" by talking optimism, doing a full day's work, and determining to make the 1921 fruit crop at least the cleanest we have ever raised.

Fruit Trees for the Farm.

Every farmer where it is possible to grow them should have a few fruit trees in a fenced orchard or yard. An acre is little enough, but at least any farm should have ten apple, five peach and five cherry trees. These cost but a trifle, but if cared for properly will supply a family with fruit in some form for the entire year. Then a row of raspberries, blackberries, currants and gooseberries and a square row of strawberries will add much to the happiness of the family.

What the Papers Interested in Fruit Are Saying

The establishment of a frozen fruit industry would furnish another outlet for fruits that otherwise might be wasted or at best find only a sluggish market. That the well-known methods of preserving fish, meat, poultry, eggs and butter by freezing should be extended more generally to small fruits and tomatoes, thus in effect making fresh fruit of these kinds available throughout the year.—*Canadian Horticulturist*.

Very much more needs to be done before the mass of farm women will have to the moderate advantages enjoyed by a limited number, the Secretary of Agriculture points out.

The States Relations Service has published the results of a survey through home demonstration agents of 10,000 farm homes in northern and western states.

Wherever it has been in operation the system of county home demonstration agents has proved to be the most helpful agency for the benefit of farm women, and it should be expanded, the Secretary asserts. He also urges increased appropriations for the research work of the Office of Home Economics of the department.—*New York State Fruitgrower*.

On the Pacific Coast there are four separate power farming and implement associations. They are the Northwest Power Farming Association of Spokane, the Portland Tractor and Implement Association, Portland, Oregon; the Traction Engine and Implement Dealers' Association, Los Angeles, and the California Tractor and Implement Association, San Francisco. These four associations united and organized the Pacific Coast Tractor Associations early in 1920. Members of this Coast association have now made arrangements by which there will be affiliation, even closest cooperation, with the National Implement and Vehicle Association, a large national association which has had more to do with advancing power farming than any other.—*The Sunswet Standard*.

In the growing of each fruit there are problems which stand out bright above others. The three that we would mention in pear growing are the small pear, the light and pear scab. The small pear must go. The time is at hand when our canneries are going to demand the 2½ inch Bartlett. Formerly they would take pears as small as two inch, but they are gradually increasing their demands and will do so more and more as the season advances. It is doubtful if Bartletts as small as 180 and smaller should be classed as Extra Fancy.

Large Bartletts can be produced by giving the trees more pruning, more rigid thinning, better tillage and irrigation when necessary. Fire blight has been ably handled in this edition by Messrs. Cate and Reimer, and we urge all growers to read their articles. Pear scab is treated in this number and can be nicely controlled if the grower will make up his mind to follow the thorough spraying as recommended by the Oregon Experiment Station.

There are a few minor troubles such as the large fruit worm, canker worm and the blister mite. This last is on the increase, but there is no excuse for its presence as it can be easily controlled.—*Oregon Grower*.

A writer in one of the leading agricultural papers states: "It is poor policy to band trees with sticky or greasy substances to prevent insects going up. While it prevents the insects climbing, it seems to be only a question of time when the material kills the tree, especially thin barked trees."

This question was recently referred to Dr. E. B. Fracker, state entomologist of Wisconsin, who says:

Banding trees with sticky substances has long been recommended for the control of climbing insects, such as cankerworms, tussock moths, gipsy and horn-tail moths, and ants which may carry plant lice.

Two forms of these bands are recommended by park superintendents and tree surgeons as being harmless to trees. One is Tree Tangle-foot, made by the O. & W. Thum Company, Grand Rapids, Michigan. The other is "Kaupenheim" which the owner can mix for himself and which is used extensively in gipsy moth control in Massachusetts and New Hampshire.

Too much confidence should not be placed in banding as it is useful only for the insects named, but for them it is a valuable control measure. The writer has never heard of the two substances described above injuring trees. Perhaps the writer is referring to tar, printers' ink, and some other compounds which are unquestionably harmful.—*Wisconsin Horticulturist*.

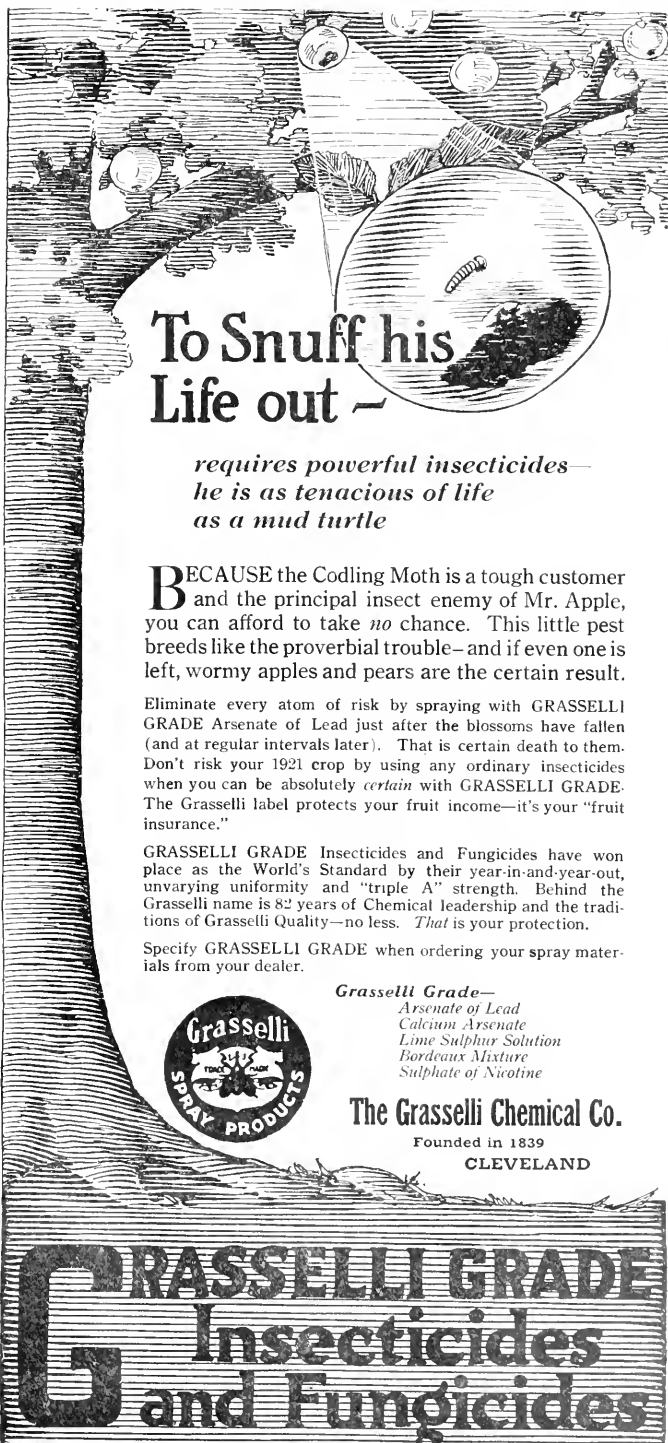
Export of Peaches Partly Successful

An experimental shipment of peaches to Great Britain made during the month of September shows that a demand exists for this fruit if it can be delivered in satisfactory condition.

The quality of the greater portion of the peaches was poor when placed on British markets. The fruit held up for a few days, then went down rapidly. The deterioration was partly the result of overtight packing, which caused bruising and led to the development of decay, and partly the result of a lack of ventilation in the packing and in the ocean storage compartments.

The peaches were packed in crates holding ten double cardboard cartons. The inside space was divided by corrugated cardboard into ten sections on the plan of an egg box. The crates were practically air tight. When placed in cold storage the moisture from the fruit was absorbed by the corrugated partitions of the carton with the result that the partitions became damp and lost their shape. The cost of the crates was approximately \$3.60 each, about one-half the value of the peaches. If shipments of peaches to Great Britain are to be successful and profitable, a cheaper crate with some provision for ventilation must be used.

Some crates holding 160 peaches sold at private sale for £2 a crate (about \$7 at the prevailing rates of exchange) or about 3 pence (nearly 4 cents) each. However, on account of the defective condition of some of the fruit, claims for reimbursement were made on one-third of the sales. The United States agricultural trade commissioner thinks that better prices and a desirable publicity would have been obtained at the Convent Garden fruit auction. There the peaches would have been sold in competition with fruit from Belgium and at least a better test of market value would have been given.



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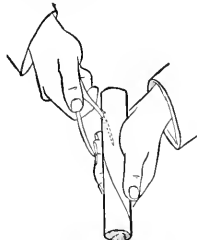
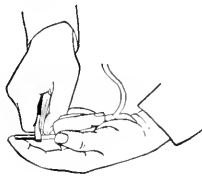
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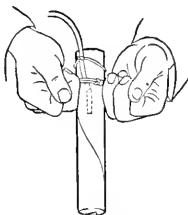
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Cut a sufficient length of fuse squarely off, and slip cap over the end. Crimp cap to fuse, as shown, with cap crimper,—it is absolutely essential to USE A CAP CRIMPER,—obtainable from your dealer or direct from us.



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Punch a hole with handle of cap crimper in the side of cartridge deep enough to contain all of the cap. See illustration at left.



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Northwest Fruit Notes from Here and There

OREGON.

The fact that anthracnose has caused many apple raisers in Oregon considerable losses this year is being called attention to as the necessity for greater effort in fighting this disease. Shipments of apples which have arrived in eastern markets from this state are said to have shown losses as high as \$100 per car from this disease.

In discussing the poisoning of bees by the calyx spray A. G. Wing, a Hood River apple grower and also a beekeeper, makes the following interesting observation:

"Is it necessary to leave this spray off to protect the bees? Some think so. For eight years I have kept from 1 to 15 colonies in an

orchard, surrounded by orchards, and I am unable to believe that they were poisoned to any extent. During that time, my colonies became strong during this spraying season, and I have never failed to get from 50 to 75 pounds of honey on an average per colony, and frequently individual colonies have produced as much as 125 pounds. When the petals have fallen the bees no longer work on the apple trees. There is danger, however, of poisoning them in some of the later sprays if an excessive amount of arsenate of lead is allowed to fall on alfalfa or clover in bloom."

The cost of producing a box of apples in 1921 will be approximately 25 per cent under 1920 costs, according to Charles H. Castner,

manager of the Hood River Fruit company. Apple boxes were retailed to growers last year at 27 to 28 cents each. A price of 17 and 18 cents, it is expected, will be established this year. The cost of strawberry crates and pear boxes shows a similar decline.

The Wasco Farm Bureau News notes that the cherry orchards in that vicinity injured by the freeze a year ago will need unusually good cultivation this year. Trees which had a great deal of top killed will be in danger of losing a large part of their root system also, and this must be prevented if possible by good care this year. When the top of a tree is suddenly killed, there is often insufficient vegetation to support the roots and some of the roots die. A root system partially dead lets in rots, grubs, and disease. Give the trees as good a chance as possible by keeping the orchards free of weeds.

A meeting of the North Marion County Berry Growers' Association held at Woodburn recently was largely attended. Twenty-three names were added to the membership roll making a total membership in the association of 50. E. J. Forsythe was re-elected president of the association, F. P. Wolfe, vice-president; Bay Glatt, secretary, and Theodore Nehl, treasurer. The executive committee consists of L. Lawrence, W. L. Bentley and C. C. Guilford. A committee which reported to the meeting on fruit prices for this year stated that the minimum prices should be seven cents on loganberries, 12 cents on raspberries, nine cents on strawberries and seven cents on gooseberries.

According to a report of the U. S. Census Bureau recently issued, Oregon in 1919 had 315,497 apple trees, 727,144 pear trees, 2,999,480 prune and plum trees and 395,073 cherry trees. The production of small fruits in 1919 was 18,977,822 quarts, including 4,159,200 quarts of strawberries, 1,821,901 quarts of raspberries, 10,198,011 quarts of loganberries, and 2,139,110 quarts of blackberries and dewberries.

On February 19, C. W. McCullagh, sales manager of the Hood River Apple Growers' Association, reported that only 40 cars of apples belonging to the association remained unsold.

A plan in which the Cherry Growers' Union of The Dalles is taking the lead is the establishment of a cooperative fruit and vegetable selling agency. The erection of a large concrete packing and storage house is being considered in connection with the establishment of the agency.

Oregon prune week, February 11 to 19, to encourage a greater consumption of Oregon prunes, resulted in a widespread campaign throughout the state and the disposal of many thousands of pounds of prunes. In addition to this phase of the work was the valuable amount of advertising which the Oregon prune received in all parts of the country. At the beginning of prune week it was stated that there were 22,000,000 pounds of prunes in the state still unsold.

WASHINGTON.

Unless unforeseen disaster happens to the apple crop of Chelan, Douglas, Okanogan and Grant counties, known as the Wenatchee district, the yield this year will be 16,000 carloads, or 12,000,000 boxes, according to the forecast of District Inspector P. S. Darlington.

This is 4,000 cars, or 3,000,000 boxes, more than the previous high record of the 1919 crop. All indications point to a 100 per cent yield in every orchard. The ground has been soaked by fall rains and heavy snows which melted, going into the soil. Fertilization and cultivation, together with pruning and thinning, have been done under the direction of experts in this district.

To make the 12,000,000 boxes in which the 1921 apple crop of the district will be packed over 60,000,000 feet of lumber will be required. This number would fill 2,000 cars, figuring 30,000 feet to the car, or 40 solid trains of 50 cars each.

More than half the boxes used in packing the Wenatchee district crop are made in that part of the state, but many are shipped from Spokane, Seattle and other Puget Sound points. District mills are now preparing to begin operations for the season in anticipation of the heavy demand for boxes that will develop if the crop comes up to expectations.

In addition to the apple crop the Wenatchee district will probably produce 2,000,000 boxes of summer fruit, which would use up more than 5,000,000 additional feet of lumber.

Paper for fruit wraps will be another item of considerable importance. No less than 6,-

600,000 pounds will be needed. This would fill 150 cars, carrying 30 tons to the car, or three solid trains.

If apple boxes sell at 20 cents apiece this year the growers will have to pay \$2,100,000, but if they only bring 18 cents, as some authorities predict, the cost to the growers will be about \$2,600,000. Paper at 15 cents a pound will cost \$90,000.

With approximately 100 delegates present the eleventh annual convention of the Western Washington Horticultural Association opened at Port Angeles February 11. The visitors were welcomed to the city by Secretary W. H. Taylor of the commercial club, response being made by Charles W. Orton of Sumner. An interesting feature of the session was Professor J. L. Stahl's reminiscences of horticulture in the Northwest. The Bing cherry and Island Belle grape were named as distinctively Northwest products, having originated here. Mr. Stahl also told of how the berry industry got its start in the Puyallup-Summer district in 1885. Cherry culture, by C. E. Fitzgerald of Ferndale, and goosecherry culture by F. H. Burgencehaus of Sumner, were features of the afternoon program.

Solid train load apple shipments were resumed out of the Wenatchee district on February 19 for the first time since Christmas. The first train to leave this year consisted of 57 cars. Up to that date 7,900 cars had been shipped

from Wenatchee with 1,600 cars still to be shipped. The total crop from the district is officially estimated at 9,500 cars. In addition to this, 1,304 cars of summer fruit were shipped, making total fruit shipments 10,804 cars, valued at about \$16,000,000, compared with 13,700 cars shipped last year, which returned the growers about \$22,500,000.

A report from Wenatchee is to the effect that as a result of the visit there of Aaron Sapiro, organizer of cooperative associations of San Francisco, announcement is made that H. G. Bohike has resigned as manager of the newly organized Wenatchee District Cooperative Association and his place has been filled by Lee M. Lampson, formerly county agent of Benton County, and recently organization manager for the Washington Wheat Growers' Association. Mr. Bohike will devote his attention to his fruit business, and Mr. Lampson will conclude the organization of the new association. The election of permanent officers of the association will occur at the annual meeting to be held in March.

The Okanogan Growers' Unit covering territory north of Spokane has begun repacking Winesaps held in storage through the winter. The pack will total about 18,000 boxes. The unit also has on hand about 20,000 boxes packed last fall and not previously shipped on account of low prices.

Increased freight rates have deprived the fruit growers of the Spokane valley of their profits on the 1920 crop of apples. It is declared that lower freight rates will have to be secured for the 1921 crop in order to secure any returns from the orchards. This is the report of several large growers of Opportunity and shippers in Spokane. They assert that the 1920 crop was raised at the peak cost of production, sold on a low market, and moved to eastern markets under the highest freight rates which absorb the ordinary margin of profit. As for the 1921 crop, they assert that lower costs of production will be offset by the low prices, leaving the increased freight rates to absorb the profits. The cost of shipping a box of apples to eastern markets before the two freight increases were granted was approximately 50 cents, shippers say; while the prevailing cost is from 90 cents to \$1, of which more than 10 cents is taken by the increased freight rates.

Bits About Fruit, Fruitmen and Fruitgrowing

The adoption by the United States Senate of the amendment to the tariff bill placing a duty of 4 cents a pound on imported cherries was announced February 17 by Senator McNary of Oregon. The news of this action on the part of the senate is being received with a great deal of satisfaction on the part of Northwest cherry growers and packers who will now be able to more than compete with the cheaper foreign fruit that was being shipped into the United States. Other legislation that is being asked for the fruit industry is an appropriation of \$10,000 for the purpose of studying new spraying methods for codling moth that will not be objected to by eastern buyers as poisonous. The idea of the investigation is to determine if it is possible to discover a spray that will be effective against this insect and

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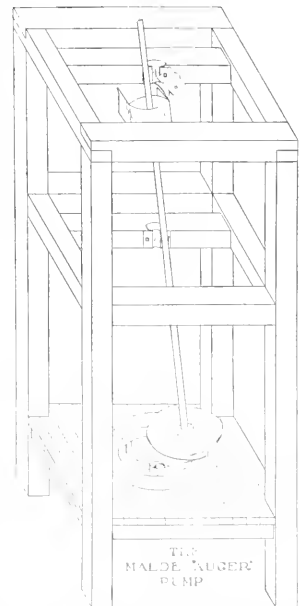
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at the same time do away with any objection that eastern apple buyers and fruit inspectors may have as to the material used being poisonous.

The fruit growers of America have requested the American Farm Bureau Federation to call a conference of their representatives to discuss ways and means of advancing their interests. President J. R. Howard has issued a call for such a meeting to be held in the Congress Hotel, Chicago, Illinois, on April 5. The Department of Cooperative Marketing will have the meeting in charge. Each State Farm Bureau Federation has been requested to send at least one official representative of the fruit growers of its state.

The Welch Grape Juice Company announces that it will build a grape juice factory at Springdale, Arkansas, to be ready for operation in 1922-23. The first investment in land and buildings will be about \$200,000. It is the intention of the company to build additional units as fast as the growth of the acreage in the Ozark grape belt warrants. Farmers in the vicinity of Springdale have pledged themselves to plant 1,500 acres of grapes this year in addition to the acreage which the grape juice company has purchased.

E. C. Crosby, who, with his son, lives on a 15-acre orchard, 15 miles southeast of Spokane, has prepared figures on the apple business which he thinks should be investigated. The Crosbys lost their 1919 apple crop because of late frost, but by smudging last spring they raised an enormous crop of the best quality and at the time of picking figured upon a net profit of \$1,000. Their apples were hand-sorted and carefully packed and in many of the boxes a card was placed asking the consumer to write the grower how much he paid for the box and in what condition the apples were found. Mr. Crosby says that from Pittsburg, where he netted an average of 40 cents a box above freight charges, two consumers wrote that they paid \$7.25 and \$7.75 a box and that from Indianapolis, where his apples netted 65 cents, the consumer wrote that he paid \$10.25 for a box of extra fancy Jonathans. All reported the fruit in good condition. Mr. Crosby further states that receipts show that the railroad companies received \$3,600 for transporting his crop, but that in addition to receiving nothing for his labor, he will also be out all the money paid for help in raising and marketing the crop. He figured that each box cost him \$1.10 when put upon the market.

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Cannery Notes

Representatives of 40 canneries located in Oregon and Washington gathered at the annual session of the Northwest Canners' Association held in Portland during the latter part of February. According to the reports read before the meetings of the association the canning industry in the Northwest is in excellent condition as far as the sale of products for the

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season is concerned. Among those who addressed the convention were W. R. Scott, of Albany, Oregon, whose topic was, "Closer Cooperation of Canners in the Willamette Valley," and C. J. Pugh of Falls City, Oregon, who discussed the child labor law. At a banquet held at the Multnomah Hotel, given by the American Can Company, the speakers were Paul W. Paver of Chicago, Preston McKinney, secretary of the Canners' League of California, and Ernest D. Clark of Seattle. The election of officers resulted as follows: W. G. Allen of Salem, president; W. S. Pride of Bellingham, Washington, vice-president; C. D. Minton of Portland, Oregon, secretary-treasurer.

According to a recent statement of W. G. Allen of Hunt Brothers Packing Company of Salem, Oregon, more than 7,000,000 pounds of loganberries will be packed by Washington and Oregon plants during the present year. He also stated that of the loganberry pack of last year there is 30 per cent of the stock unsold in the two states and 27 per cent of the entire stock of all fruits still unsold February 20.

California canneries are reported to have put up 267,000 tons of fruit in 1920 making the total number of cases 11,382,863. The total vegetable pack was 5,249,946 cases.

It is announced that the California Central Berry Growers have decided this year to sell direct to the canner in order to eliminate the commission heretofore paid the jobber. The central California berry production in 1920 was: Strawberries, 84,000 chests; blackberries, 19,000 chests; raspberries, 9,000; loganberries, 8,500.

What They Are Doing in California

Extensive investigations on the question of arsenical spray residue in regard to the marketing of pears are planned by the Federal Bureau of Entomology in cooperation with the Pest Control Service of California State Department of Agriculture. The work will be done under the direction of A. J. Ackerman of the United States Department of Agriculture who will establish his headquarters at Sacramento.

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LOS ANGELES

Almond trees are reported to have commenced blossoming in some of the districts in California the first of February while deciduous fruit buds began swelling preparatory to blooming.

The California orange and lemon crop matured nicely in most sections. The crop of oranges is reported as unusually large although the size of the fruit is generally smaller than it was last year.

Walnut groves in Contra Costa and Santa Clara counties which will come into bearing this and next season it is expected will shift the supremacy of walnut production from Southern California to other sections of the state. The California Walnut Growers' Association reports its total pack for 1920 crop as 321,480 bags, of which 11,827 bags remained unsold February 1st.

Kings County fruit growers realized a total of \$7,355,653 for their 1920 fruit crop, an increase of more than a million dollars over 1919 figures of \$6,258,810, according to the annual report of the county horticultural commissioner. Grapes led with a total value of \$1,615,726, divided as follows: Raisins, \$2,813,100; shipped fresh, \$1,432,906; wine, \$369,720. Peaches, canned, dried and shipped fresh, yielded \$1,776,477; apricots, \$773,290; prunes, \$168,000; plums, \$17,100. The apricot crop was only about 60 per cent of that of 1919, and the prune and plum yield much lighter, grapes and peaches about equal, the increased return being due to the uniformly higher prices received for all fruits.

Railroads operating in California have shortened by two days the running time of fruit trains between the coast and eastern markets. The change was inaugurated at the request of a committee appointed by Director of Agriculture Hecke at the Fresno convention of fruitmen in November.

Advices from the Horticultural Commissioner of Yolo County are to the effect that 500 additional acres of grapes will be planted in that county this season. Last season Yolo county planted 1,132 acres of table grapes and 1,532 acres of wine grapes.

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Fertilizer for Orchard and Bush Fruit

Continued from page 8.

assume various conditions under which the grower may be working.

First, there is the young orchard, not yet in bearing. As a rule such trees will not need fertilization of any kind. Generally, such trees are planted on new soils and clean cultivation practiced. Strawberries or other hoed crops are planted in between the trees. The fertilization and care given the inter-crop should be sufficient to keep a healthy tree growing vigorously. On the other hand, if the trees are receiving good care but do not respond, the writer recommends the use of a small amount of nitrate of soda ranging from one-half to one pound per tree.

The above will apply to apple, pear, cherry or peach. The use of nitrate is recommended as a supplement to good

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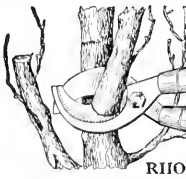
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irrigation and cultivation but not as a substitute. There are many young trees (re-plants) in the old orchard. Often these trees are badly neglected in that they are growing in sod and receive no clean cultivation. These conditions should be remedied and here again nitrate can often be used to advantage.

Trees just starting to bear must be handled with considerable care. Often they are making a very vigorous growth and heavy fertilization and pruning will retard the formation of spurs and production of fruit. If the trees are making a normal growth it is doubtful whether the use of nitrate will be advisable. On the other hand if trees are starting to bear heavily and growth is but moderate, the use of probably two pounds nitrate per tree will be advisable. Such trees as a rule have not yet been grow-

ing in the presence of a shade crop such as clover or alfalfa.

Then there is the older orchard. In most cases the grower has been using nitrate of soda for a number of years. The response from its use has been very satisfactory in that greater yields have been secured. Tree growth has been much more satisfactory. In the meantime, clover or alfalfa has been grown and turned under. Such a practice is sufficient to furnish enough nitrogen for several crops if followed by clean cultivation, assuming of course that the soil is average and has not been depleted of plant food by protracted clean cultivation or intercroppings. On the poor sandy soil, more than one green crop must be turned under to build up a soil and provide sufficient humus.

It should be pointed out that two tons

of alfalfa are capable of furnishing approximately 200 pounds of nitrogen, an amount sufficient to grow a 500 bush crop of apples in addition to taking care of tree growth. In most orchards alfalfa does fairly well. That a great deal of nitrogen, not formerly fixed in the soil is now being secured from such a source is quite evident. Trees growing under such conditions make a normal growth and produce well.

Experiments with nitrate of soda were made with trees growing in the presence of alfalfa which had been seeded for several years. Neither the alfalfa nor the trees have ever been fertilized. The use of nitrate of soda under such conditions during the year when a heavy crop of apples was borne did not increase yields or improve the quality of

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the fruit which was excellent. Evidently the alfalfa was capable of furnishing sufficient nitrogen.

On the other hand there are orchards making scarcely a normal growth on which heavy crops are expected this year. The alfalfa may be pretty well "run out" being largely replaced by grassy sod. We know that such alfalfa is less capable of fixing nitrogen and that the grass takes a great deal of available nitrogen. Consequently the trees do not receive a normal supply for maximum production. Such orchards should be plowed or disked up and clean cultivation followed for one or two years, after which it may again be seeded to alfalfa, vetch, etc. In the meantime cultivation should be thorough and persistent not only to liberate plant food but to free the land of weeds and grass.

Where orchards are being seeded to clover or alfalfa, especially for the first time, it appears well worth while to use a small amount of nitrate of soda. This is especially so in the case of clover. If this is not done the trees during the second season following seeding do not do well. This is a common observation at Hood River. During the period when a shade crop is being established it is advisable to use a small amount of nitrate which will supplement the supply of nitrogen when cultivation cannot be given and before that time when the shade crop may be expected to furnish this element.

Strawberry Fertilizers.

For strawberry growers the writer recommends the use of a complete fertilizer testing approximately as follows: Nitrogen, 6.5 per cent; phosphoric acid, 7 per cent; potash, 8 per cent. This is made up as follows: Nitrate of soda, 800 pounds; superphosphates, 800 pounds; bone char, 400.

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This fertilizer should be applied at the rate of 500 pounds per acre annually in two equal amounts. In early spring put on 250 pounds per acre. Apply the

other 250 in late summer right after the topping season. When thus used the grower should secure a maximum production of firm berries.

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My book also contains my feed formulas and methods that save me 25c to 50c a hen a year, and produced fourteen 300-egg hens out of 450 pullets. How I fed a test pen of 90 pullets one grain feed a day and got four 300-egg hens. How I selected the pullets from the general flock to be trapped that made so many high producers.

Other items are: Self-feeding hoppers that are absolutely wasteproof, Artificial lighting, Self-cleaning chicken crates, Self-cleaning nests, Sanitary dropping board with mileless roosts, No. 1 Mite Paint at 10c to 25c a gallon, Wet mash mixer for 500 to 1000 hens for \$1, etc.

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With the Poultry

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CULLING A FLOCK OF HENS.

In a bulletin recently issued on culling a flock of hens Byron Alder, of the Utah experiment station, brings out the following salient points:

Hens which are expected to produce eggs at a profit must be housed in comfortable roomy quarters, must be fed a ration which supplies all that is necessary to manufacture the eggs, and above all, must have the ability to lay. In all breeds or strains of fowls there are individuals which are poor layers because of some inherent quality which prevents them from making the best use of the care and the feed they receive. It is this which robs many poultry raisers of part or all of their well-earned profit. The elimination of the non-producer from the laying flock is an essential part of good poultry management. Many flocks which are now producing at a loss would be made profitable by culling the poor layers. Because of the high price of all poultry feeds the necessity for a strict, rigid culling was never more important than now. More eggs will be obtained from a few good, vigorous, well-selected hens properly fed than from three or four times this number of ordinary hens over-crowded and poorly or under-fed.

The first essential for a good layer is a strong, vigorous, well-developed body. Any hen that shows a lack of vigor should be eliminated. This lack of vigor may be indicated by a long thin beak and head, (crow head) by dull eyes, pale swivelled comb, long toenails, and by the habit of spending much of the time during the day on the perches. This type of hen should be sent to market at any season of the year she is observed, whether she is three months or three years old.

Culling the Pullets.—The flocks of pullets should be gone over carefully early in the fall and all those eliminated which show a lack of development, are thin and emaciated, or have an unthrifty, listless, inactive disposition. The ability of a pullet to lay is limited by the amount of feed she can consume; therefore she must be large through the body and must have a well-developed abdomen. The color pigment test cannot be applied on pullets before they begin to lay. All White Leghorn pullets and most pullets of the American breeds should have deep yellow shanks, beak, and skin until they have begun laying, so that there will be several months before they will begin laying again. Second, part of the old hens should be disposed of to make room for the pullets.

PARASITES ON POULTRY.

At least nine different species of lice, several species of mites, and at least two species of fleas attack the hen, according to entomologists at the New York State College of Agriculture at Cornell University. Hens, geese, ducks, and in fact all kinds of domestic fowls, are likely to be infested. Waterfowl are popularly supposed to be free from such pests, though the experts say they are always infested. Some of these cause serious injury to the fowls, with a consequent loss of profit to their owners.

The bird lice that are found on poultry are known as permanent parasites; that is, they spend their entire lives on the bodies of the fowls. They have biting, not sucking, mouth parts and their feet have sharp claws which scrape the skin of the fowls in the constant movements of the lice over the fowls' bodies. The constant irritation caused by the presence of the lice it is stated, eventually weakens the fowls infested and renders them susceptible to such diseases as gapes, cholera, roup, and others.

Of mites there are at least eighteen species parasitic on poultry. Some of these are not permanent parasites, but attack the fowls

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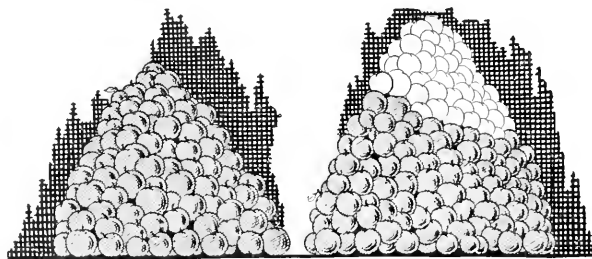
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only at night, hiding during the day in cracks about the poultry house. Some of the species of mites are blood-sucking; others cause affections of the skin. Under certain conditions they become exceedingly abundant, and great loss to the poultry owner results from their effect on the fowls.

Methods of Control.—The most potent cause of the presence and increase of these parasites is filth. This statement is not only the result of common observation, but of experiments in control measures made by the college experts. Filth as here used includes decaying and decayed eggs, and bits of decayed matter of all kinds. The poultry house and the nests should be always kept clean, and there should be ample provision for light and air. Poultry parasites, like most other pests thrive much better and increase much more rapidly in dim than in well-lighted places. If a poultry house is already infested with mites and is too valuable to be burned down and rebuilt, it may be sprayed inside with kerosene or crude petroleum, which may be made into an emulsion if desired. Two, and sometimes three applications should be made.

HIGH PERCHES.

An authority on poultry says that if you have heavy birds do not let them jump too far from the perch to the ground or floor. If you have board floors or hard ground it is likely to bruise the foot so that the hens will have what is called "bumble foot." Besides being unsightly, this is a real painful condition and hens cannot do their best which have it; so it pays to look after these little things that make for hen comfort. All in all, the hen whose comfort is looked after is the profitable hen, and that is what the average poultryman wants.

POULTRY NOTES.

One of the most essential things in securing vigorous chicks is care in selecting the hatching eggs whether they are to be placed under the hen or in the incubator. You should see to it that your hatching eggs come from your best fowls.

Nothing kills young chicks more quickly than to allow them to become chilled. Thousands of chicks die annually from this cause. Place the brooder where it will get plenty of sun and where the little fellows will have plenty of room to run about, yet be protected from the cold. Or if it is heated see that a proper amount of heat is evenly maintained.

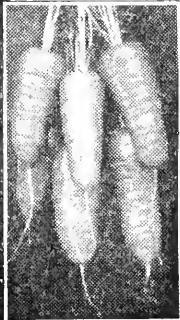
You may feed your poultry well and still get few eggs. An examination of your poultry house may reveal one of the reasons. A tightly built warm poultry house is as essential to egg laying as is plenty of fresh air during the daytime.

The Oregon Agricultural College experiment station calls attention to the fact that hens fed for egg production should get feed containing the food elements found in the egg. An analysis of the egg shows that it is composed of ash 12.2 per cent; water 65.7 per cent; protein 11.1 per cent; and fat 8.9 per cent. The hen cannot counterfeit her product, so must be supplied with the necessary raw materials or she cannot manufacture the finished product.

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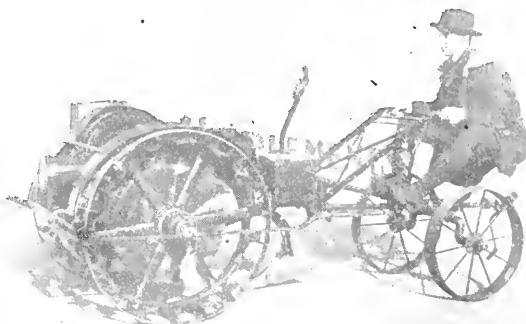
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BETTER FRUIT

VOLUME XV

APRIL, 1921

NUMBER 10



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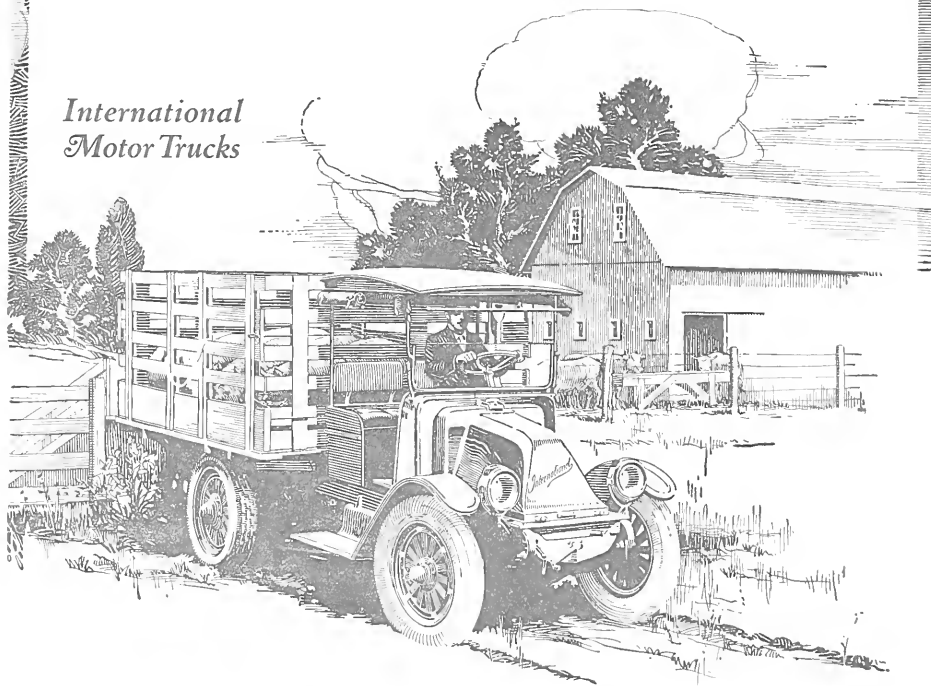
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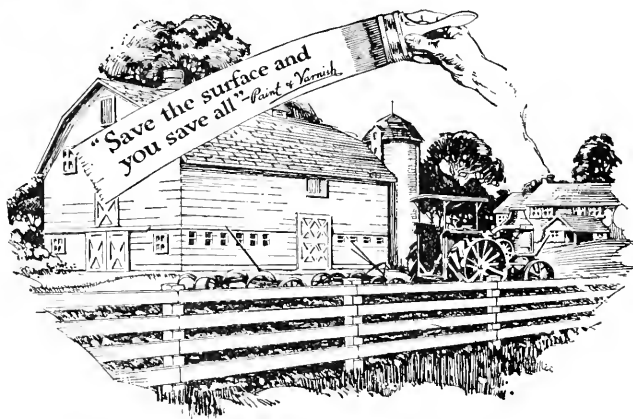
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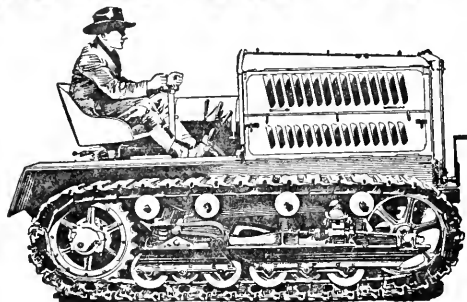
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makes it adaptable to a wide range of work. The 5-Ton turns short, pivoting on either track.

Most important of all are the factors of long life, low upkeep cost, low operating expense, in which the "Caterpillar" 5-Ton Tractor holds a position of superiority not even approached by any other orchard tractor—a position established by its achievements, on two continents, in every kind of work, under every conceivable condition.

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An Illustrated Magazine Devoted to the Interests of Modern
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PORTLAND, OREGON, APRIL, 1921

NUMBER 10

Controlling Brown Rot of Stone Fruits

By D. F. Fisher, Pathologist, Fruit Disease Investigations, U. S. Department of Agriculture

ONE of the most serious menaces to the crop of stone fruits in the humid sections of the Pacific Northwest is the disease called brown rot, and caused by a fungus technically known as *Sclerotinia Cinerea* (Bon.) Wor. Most orchardists are familiar with its attacks on the ripening fruit, but few appreciate its significance at other seasons, such as the rot of immature fruit, twig and limb cankers, and particularly as a "blossom blight," which prevents the setting of a crop. Fewer still understand important facts in the life history of the fungus which have a bearing on control methods. Since brown rot generally accompanies a period of rainy weather, the manifestation of the disease, both on blossoms and fruit, is frequently regarded as "just rot," or an unavoidable result of climatic conditions. Wet weather is essential to the growth and dissemination of the fungus and the spread of the disease, but is not otherwise concerned in the damage, except as it may hinder control methods, such as early spring cultivation or spraying.

LIFE HISTORY OF THE FUNGUS

SINCE most people are more familiar with its occurrence on the ripe fruit (fig. 1), this stage will be a convenient one from which to start an account of the life history of the fungus. There is never difficulty in finding plenty of fruit destroyed by brown rot during the ripening season of cherries, prunes, and other stone fruits in the humid sections west of the Cascades, and if there happens to be a rainy period at this time a large proportion of the crop may be destroyed. One rotten prune or cherry carries enough spores, or "seeds" of the fungus (a parasitic plant) which causes the disease, to infect the whole orchard or neighborhood. These spores are microscopic in size and are produced by myriads in the ashy gray tufts which cover the rotted fruits. The spores are wafted about by the wind or carried by insects, and if one is deposited upon a sound fruit and there be moisture present it will germinate the same as any

other seed. But the germ tube in this case penetrates the skin of the fruit and destroys or "rots" the tissues. Within a short time spore-tufts break the skin of this fruit and a new crop of "seeds" is ready for dissemination. If rainy



Fig. 1. Brown rot on maturing Italian prunes. The small tufts scattered over the rotted prunes are composed of millions of spores, each one of which is capable of infecting a sound fruit if it finds suitable lodgement on it. The disease also spreads by contact as shown in the illustration, having first started on the dried up prunes and spread progressively through the cluster.

weather continues the disease spreads like wild-fire, and fruit that is sound at night will show rotted spots in the morning. Brown rot is omnipresent in all orchards of this section and it is due to this fact that long distance shipment

of the ripe fruit is impracticable. It is never known whether fruit is infected or not, or whether in the humid atmosphere of a refrigerator car it will "stand up" in transit. Fortunately the district is well supplied with canneries and dryers which furnish a profitable way to handle the crop, and fresh-fruit shipment is not essential. But even with the canned and dried fruit outlet serious difficulty is frequently met in saving the crop long enough to process in rainy seasons.

THE rotted fruits either cling to the tree over winter as "mummies" and shed more of the same kind of spores in the spring to infect the blossoms, or, as is more generally the case in the Pacific Northwest, at least, they fall to the ground where the fungus undergoes a certain change of development. Under these conditions it forms hard or stony "sclerotia" or resting bodies in the tissues of the rotted fruit. By this means it is carried over into another growing season. Whether it rests one or two years is a mooted point with different investigators, but evidence collected by the writer indicates that it may be either one or two years.

These "mummies" become covered with soil or refuse, or are kept moist by close contact with the soil, and about the time the buds are swelling in the spring they also resume activity. From the sclerotia in these mummies a stalk-like body appears, growing toward the surface of the ground. The length of the stalk varies with the depth the mummy is buried, the writer having collected some as long as five inches. Reaching the surface, there is unfolded from the top of the stalk a cup-shaped structure that soon flattens and sometimes becomes inverted like an umbrella. (See fig. 2). This is similar to an ordinary mushroom or "toad-stool" and is technically called an "apothecium." It carries myriads of spores of another type than those produced on the ripe fruit. They are contained in tiny sacs which are closely packed together on the inside of the cup—or outside of the um-

bellia, as the case may be. When the proper stage of maturity is reached the containers are ruptured and the spores are expelled.

These "ascospores" are disseminated the same as the spores on the ripe fruit—by wind and insects, and, finding lodgement on a fruit or bud or blossom in the presence of moisture, will grow as in the other case described, thus producing a rot or "blight" of the blossom (fig. 3). Apothecia continue to appear until after the blossoming season, and so when weather conditions are favorable particularly a day or two of continuous wet or muggy weather at a time) serious damage is done to the prospective crop. There is hardly a season but what some loss occurs and actual observations of the writer have frequently shown as high as 90 per cent of cherry blossoms affected by brown rot. Orchardists have often attributed this damage to the rainy weather preventing pollination, to frosts, or to some other more generally understood reason.

WITH the rotting of the blossoms the growth of the fungus follows the same course as in the case of the rotting fruit and the spores produced are the same kind as on the ripe fruit. Ascospores are produced only from old mummies that winter over on the ground. The other type, or summer spores, as they may be called, are produced throughout the growing season and are visible over a considerable period. Blighted blossoms with their store of spores may be found attached to the trees as late as June or July. Thus a supply of spores is always at hand to infect the young green fruits if weather conditions are favorable, and the fungus is carried over until the time of harvest the second year, when the cycle begins over again. Usually the seasons when greatest damage occurs are at the time of blossoming and at harvest, but if an extended wet period occurs serious loss may be expected at any time.

Considerable work has been done by the Oregon Experiment Station relative to limb cankers and it is possible that they may be a source of infection in the spring, but in general these cankers are unimportant in the life economy of the fungus. Twig blight sometimes occurs when the fungus works back from infected blossoms or fruits. This has been observed especially on sugar prunes in the Northwest and on peaches in the East and South.

CONTROL METHODS

EXPERIMENTS on control methods were carried on by the department in Clack county, Washington, and Marion county, Oregon, from 1915 to 1919, and the recommendations below are based on this work.

Effective control of the disease requires attention to cultural and spraying practices. Mummies should not be allowed to hang on the trees over winter and it would be beneficial if all the rotted fruit should be gathered and destroyed, but under large-scale operations this is impracticable. Resort should be had, therefore, to thorough tillage from the time the buds first show color

of application must be emphasized, for if a fruit or a portion of a fruit is not thoroughly covered there is a chance for infection to take place on this area. Finally, we must use an effective fungicide or spray material. Of these there are several that can be relied upon to control brown rot, but mention will be made of only three that may be regarded as standard.

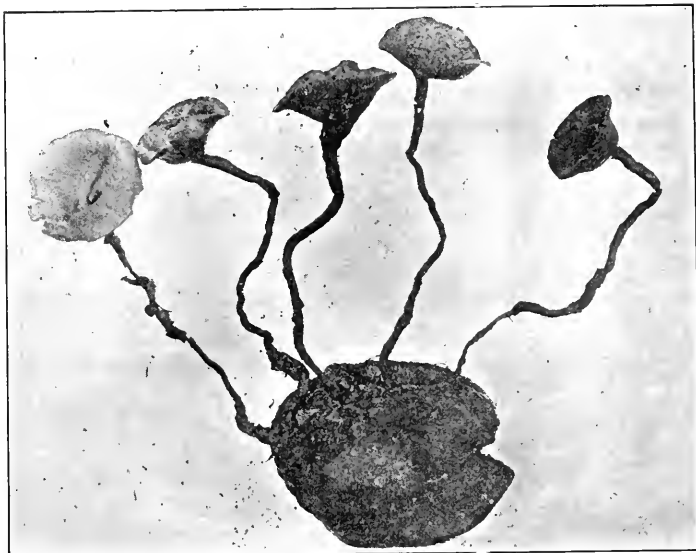


Fig. 2 Italian prune mummy with five apothecia attached. Apothecia appear during the blossoming season and shed myriads of spores which blight the blossoms and prevents them from setting fruit.

until after the blossoms fall. This will destroy large numbers of apothecia and reduce the chance of infection at this season. Heavy wet soils will seldom permit of this practice so early in the season, but where it can be followed it will be found of distinct value. Pruning the trees to admit air and sunlight will also be beneficial since drying will follow more quickly after rains and favorable conditions for spore germination will thereby be curtailed. But these cultural practices, while in themselves valuable, are only to be regarded as supplementary to spraying, which must be the main reliance of the orchardist in combatting brown rot.

In spraying for this, as for other fungus diseases, the point to keep in mind is that this treatment is preventative and not curative in nature. That is, by applying a fungicide we cover susceptible parts with a material that prevents the spore from germinating or destroys the parasite before it can invade the host. Once infection has taken place, meaning that the tissues of the fruit or blossom have been invaded by the fungus it is too late to destroy it by sprays. Hence timeliness of spraying is a prime essential. Next, thoroughness

BORDEAUX Mixture, 1-1-50, is the old stand-by, and for effectiveness can hardly be improved upon, but it is not safe to use on peaches and some tender plums. For cherries and Italian prunes it is quite satisfactory, although frequently causing more or less severe foliage burning early in the season or during wet weather. It is also more expensive than the other materials mentioned below.

Commercial lime-sulphur is safe to use on cherries and prunes at a dilution of 1 to 50, but must not be used on peaches or Japanese plums at any dilution. Applied during late summer, when hot weather prevails there is sometimes severe foliage injury. It is, however, an effective control agent for brown rot.

Self-boiled lime-sulphur, 8-8-50 (8 lbs. lime, 8 lbs. sulphur, 50 gal. water), is possible the safest and best all around fungicide for use on stone fruits, and may be used on peaches without danger if properly prepared. It is best made in lots sufficient for 200 gallons of spray. Place 32 lbs. of good fresh stone lime in a 50-gallon barrel and start slaking by adding sufficient water for that purpose. When the action is well

(Continued on page 15)

Western Apple Industry Problems

By Dwight L. Woodruff, District and Export Manager Hood River Apple Growers' Association at New York

THE apple season of 1920-1921 is now about ended. The curtain will soon be rung down on the final act and many in the audience will turn away not wholly satisfied.

Every industry has its trials and victories, smooth sailing never develops strong, brave and capable sailors.

No business has escaped the experience of post war readjustment. All lines of industry are slowly but surely settling down to a basis of safety and adjustment to new conditions brought about by the awakening from the experience of exorbitant prices, big profits, easy money, unnatural demand and lax financial methods.

Perhaps no class of producer has suffered more severely during the business depression of the past eight months than has the American farmer, but among these probably the Northwestern fruit grower has been as little injured as any. We are all disposed to believe our lot the most burdensome and difficult. It is easy to see the fine points of the "other fellow's" particular line of business while bemoaning our own situation.

Statistics seem like dry reading, but reference to the table below will be both helpful and cheering.

Wholesale decline in prices between February 1, 1920, and February 1, 1921, as published by the Irving National Bank, New York City:

Breadstuffs	32.3
Livestock	38.1
Provisions	23.3
Fruits	16.0
Hides and Leather.....	41.1
Textiles	57.1
Metals	35.9
*Coal and coke.....	23.0
Oils	40.4
Naval stores	50.7
Building material	9.2
Chemicals and Drugs.....	6.0
Miscellaneous	60.8
*Increase.	

Thirteen commodities, including the miscellaneous list, show an average decline of 42.3 per cent, while fruits only show 16 per cent. Coal and coke show advances and only two items less decline than fruits.

A comparative reference to gross sales at the big consuming centers show only slight declines on standard varieties and sizes of apples, but the net returns are very much less on account of greatly increased freight charges, storage rates and other advances.

Sober thought compels us to admit we have much to be grateful for. However, we should not lose sight of the fundamental fact that no business can stand

still. We must either advance or recede, for we are surely now facing unusual conditions which must be met and mastered if we would maintain our rightful place.

The most outstanding problems we have to deal with, as I see them, are:

First—Transportation charges.

Second—Size and quality of our fruit.

Last—Wide difference between wholesale and retail prices.

The three problems are closely interrelated. Transportation rates may decline and then again, they may not. If they do decline, the grower directly benefits, but his difficulties are not thereby altogether overcome, as many would have us believe. Should the rates remain unchanged, we must rapidly alter our export methods and use the all water routes to the United Kingdom and Continental Europe for pears and apples.

The question of size and quality of our Western apples is a most serious one. Fifteen years ago with our young trees bearing large clean fruit, our output decidedly limited in quantity, we had no task to readily dispose of our crops at satisfactory prices and, in fact, the buying competition was exceedingly keen. Dealers in New York, Chicago, Philadelphia and other large cities were eager for all the fruit we could produce.

As our crops increased, the growers in New York state, New England, Virginia and, in fact, all apple producing states saw what the Northwest was doing and quickly bestirred themselves to meet this new competition by systematic spraying, pruning, cultivation, fertilization, improved grading and packing methods and while this was going on, the West had suffered some serious disappointments—low prices, the result of outgrown selling methods.

This was the direct cause of many growers neglecting their orchards until as a whole the Northwest produces far too many second and third grade small sized apples that come in direct competition with apples grown much nearer the large consuming centers which can profitably be sold at the price Western growers pay for freight.

The freight on a box of jumble pack Ben Davis is the same as on a box of 3½ tier extra fancy Spitzenburgs or Delicious, but the value in New York is as one dollar is to five dollars. The one shows a dead loss; the other a substantial profit—which will you grow?

Let us forget the two or three abnormal years just passed and get our feet back on earth again. Stop deceiving ourselves into believing that the only

(Continued on page 16)

Red Gravenstein Apples

See front cover of this copy of Better Fruit for full sized colored illustration of the Red Gravenstein apple which possesses all the good qualities of the old Gravenstein in flavor, size, shape and ripening period, to which is added a bright red color, greatly increasing its attractiveness and market value. The Red Gravenstein has established a record for quality and productivity which makes it a leader.

Our stock of Red Gravenstein trees is entirely sold out, but we will again offer trees of this splendid variety for fall, 1921, and spring 1922, delivery. Place your order now and be sure of getting your Red Gravenstein trees next season.

Meanwhile:

For commercial planting we still offer in limited quantities the following fruits in proven varieties:

APPLES	PLUMS
PEARS	CHERRIES
PRUNES	And other
PEACHES	Fruits

Also a big line of small fruits, choice shrubbery, shade trees and roses.

Whether a few trees for a home orchard or thousands of trees for a commercial orchard, you want the best. Good trees soon pay their own cost.

Eighteen years in business at this same location and thousands of satisfied customers throughout the West are evidence of good trees and good service.

Planting time is at hand. Write us now. Satisfaction guaranteed.

WASHINGTON NURSERY COMPANY
TREES · SHRUBS · ROSES · BERRIES
"1905" TOPPENISH, WASH.

"Largest in the State"

Salesmen Everywhere—More Wanted

**BEST SERVICE-
QUALITY & PRICES**

**PERFECTION IN
FRUIT
LABELS**

THE
SIMPSON & DOELLER CO.
1423-24 NORTHWESTERN BANK BLDG.
PORTLAND, OREGON.
E. SHELLEY MORGAN
NORTHWESTERN MANAGER
WE CARRY-AND CAN SHIP IN 24
HOURS-STOCK LABELS FOR PEARS,
APPLES, CHERRIES & STRAWBERRIES.

Keeping the World Warm Overnight

THE weather bureau of the United States Department of Agriculture has been able to discover the weapon used by that old enemy of mankind, Jack Frost, and in a recent published report it tells the farmer and fruit grower just what Jack's invisible weapon is, and how, under ordinary conditions, the sprite's own artillery can be used against him.

Frost, of course, occurs whenever the mercury drops to 32 degrees Fahrenheit or lower. If much moisture is present in the atmosphere this drop in temperature is manifested by the white

crystals of frozen moisture upon leaf or grass stem, and there is what is known as "white frost." If the temperature drops to the required degree and does not reach the point when water from the air is condensed, there will be few crystals deposited, and the result is a "black frost." A "freeze" is the term applied to a condition of cold more permanent than frost, and such a condition may occur when there are high winds. True "frosts" occur only when the surface air is relatively calm.

Temperature, like water, seeks a level. During the day the earth receives more heat than it can throw off, but at night, this supply of heat is stopped. During the day the heat thrown off by the earth warms the thin blanket of air next the ground. This blanket, as it warms, loses its density and ascends. Cooling as it rises, presently it encounters air of its own temperature, and there it stops. Meanwhile its place has been taken by other colder air, which is in turn warmed by contact with the ground. This exchange goes on until, at sundown, all the air of a wide layer above the earth has been warmed, and the highest temperature is felt nearest the earth.

Play Safe

"Black Leaf 40"

(Nicotine Sulphate)

is safe and effective for
APPLE aphids and red bug
PEAR psylla
GRAPE Leaf-hopper "thrips"
and other soft-bodied, sucking
insects on fruits, vegetables and
ornamentals.

"Black Leaf 40" does not
injure Fruit or Foliage

"Black Leaf 40" may be combined with Lime-Sulphur, Bordeaux, Lead-Arsenate, soap and other spray materials, thereby saving the expense of a separate application.

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formulas, nearest dealer, etc.,
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and Chemical
Corporation**

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LOUISVILLE, KENTUCKY



Orchard Heating Scene in the Grand Junction Valley, Colorado

Hart's Poultry Book

With Plans for an Ideal Brooder

My brooder plans tell how to make a brooder for 100 to 500 chicks. Use one-burner oil cook stove for heater. I threw out my coal and distillate stoves when I invented this system. No thermometer or thermostat needed. No over-heating, chilling, worry or grief. No burnt air in the brooder room or hover. Don't need to teach chicks to roost. A child can operate it. Very simple. Turn any old shed into a brooder house. Directions for new house.

Feeding directions for chicks tells not only just what to feed, but exactly how much—right to the ounce—no guess. No gapes, toe-picking, leg-weakness, diarrhea, etc., in our chicks.

My book also contains my feed formulas and methods that save me 25c to 50c a hen a year, and produced fourteen 300-egg hens out of the 450 pullets. How I fed a test pen of 90 pullets one grain feed a day and got four 300-egg hens. How I selected the pullets from the general flock to be trapped that made so many high producers.

Other items are: Self-feeding hoppers that are absolutely wasteproof. Artificial lighting. Self-cleaning chicken crates. Self-cleaning nests. Sanitary dropping board with miteless roosts. No. 1 Mite Paint at 10c to 25c a gallon. Wet mash mixer for 500 to 1000 hens for \$1, etc.

HART'S POULTRY BOOK \$1.00

Remember this—your money back if not satisfied with the book. Over 700 sold last spring. You can't lose.

**W. H. HART, R. 3, Box G,
BEAVERTON, OREGON**

IN FROST susceptible districts progressive fruit growers have learned that the best way to protect their orchards is by kindling numerous small fires or by the use of heaters.

This method of preventing frost is very efficient, and each year it saves much money for American fruit growers. Just how it has been applied, how many fires are needed to the acre, and the form and style of burner giving the best results, are well discussed in the Weather Bureau Bulletin No. 1096.

Many a fruit grower has nursed an expensive orchard to the point of bearing only to see his well-deserved reward vanish in a single night. But more and more we are discovering that, if we can not defy certain natural laws, we may still nullify their results through a better understanding of their principals. This is what the up-to-date fruit grower does. He cannot eliminate frost but he can use its principles to protect himself from its effect.

THE weather bureau bulletin treats the frost prevention methods very thoroughly, and the pamphlet should be particularly useful to anyone who owns an orchard or who contemplates planting one. First of all, the experts point out, the orchard owner should determine whether his crop will pay the expense of protection if it will not, then he had better move to a less erratic climate. Certain fruits will stand a lower temperature than others and the experts furnish a temperature chart to show this.

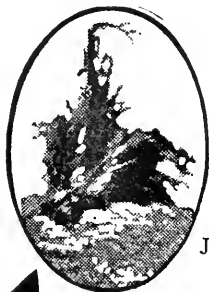
Here it is:

TEMPERATURES ENDURED BY BLOSSOMS
FOR 30 MINUTES OR LESS

Fruit	Closed but Showing Color	Full Bloom	After Fruit Has Set
	Degrees	Degrees	Degrees
Apples	25	28	29
Peaches	25	26	28
Cherries	25	28	30
Pears	25	28	30
Plums	25	28	30
Apricots	25	27	30
Prunes	25	29	30
Almonds	26	27	30
Grapes	30	31	31

Charts which show in a graphic way how the fires should be distributed through an orchard are reproduced. These have been prepared from studies made in successful orchards and are the result of the best method in use in this country. Overhead costs are discussed, as well as the care of the frost-fighting apparatus.

Precautions against pear blister mite should be taken at once. The use of lime-sulphur put on at a strength of 1 to 8 or miscible oil, 1 to 17, just as the buds are swelling will give control of this pest.



Out!

and ready
for the pile in no time!

Just one hole bored at the proper angle
and loaded with a few sticks of



STUMPING POWDERS
Du Pont and Repauno Brands
(Pacific Northwest Products)

firmly tamped in with three feet of fuse attached, the flare of a match—and this great stump was torn from its resting place and ready to be laid on the pile.

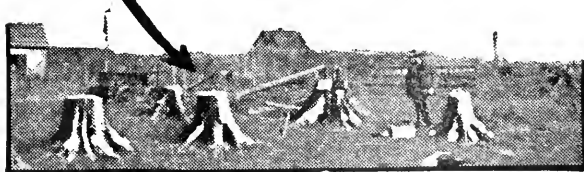
Quick, simple and cheap—Du Pont or Repauno Stumping Powders are ready *right now* to help you clear your land, or plant your trees. Use Du Pont Nitroglycerin Dynamite for ditching.

Your dealer will supply you with Du Pont Explosives and Blasting Accessories.

Our free book, "Development of Logged-off Lands," tells you how to use explosives for stump and boulder blasting, ditching, tree-planting and other farm work. Write for a copy TODAY. It's free.

E. I. du Pont de Nemours & Co., Inc.

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Sweet Cherries
Apricots and
Grapes
A SPECIALTY

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RICHLAND WASH.

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Attorneys at Law
610 Spalding Building, Portland, Oregon
Attorneys for Better Fruit Publishing Co.

The Peach and Prune Twig Borer

By Claude Wakeland, Entomologist, University of Idaho

THE peach and prune twig borer which annually causes severe injury to peaches, prunes and apricots can be easily controlled with lime-sul-

phur solution when applied to the trees just before the blossoms open. The borer passes the winter as a tiny brown worm in the crotches of the trees

and emerges to begin boring into the tips of the trees about the time the blossoms have opened.

Like most of the injurious insects in the United States, the twig-borer is not a native but was introduced into this country from Western Asia. It has been known in the United States since 1860 and now has a wide distribution. While it feeds more generally on the peach than on others of the stone fruits, it attacks also apricots and plums and is of particular importance in Idaho because of the loss it causes prune growers.

"—and it's a real box too"

boasts the boss packer



"for it's made by the Bloedel Donovan Mills. They use the best selected spruce and hemlock shooks. The quality of the box means a lot in preventing shipping losses."

Standard apple boxes, crates and cases of selected materials, carefully constructed.

Our large and complete stock enables us to make prompt shipment. Write for price lists.

Bloedel  **Donovan**
Lumber Mills
1018 White Bldg. Seattle U.S.A.

CAUSE OF INJURY

INJURY is caused by the larvae or worms of the borer. These hibernate in small, silk-lined cells just beneath the surface of the bark in the crotches of branches and twigs. In the fall they may be easily located by the presence of little mounds of borings over the entrances of their burrows. After larvae have ceased activity in the fall and the borings are destroyed or rubbed off, they are difficult to discover and the orchardist who would find them is likely usually to have considerable digging around in the crotches if he observes them.

At about the time peach buds begin to show pink in the spring the overwintering larvae become active, work themselves out of their silk-lined cells and make their way to the twigs where,



YIELD, size, flavor, and shipping quality of fruits are dependent on the kind and amount of plant food available to the crop.

With the right kind of fertilization riper fruits can be harvested and shipped, and still reach the consumer in satisfactory condition.

The improved flavor, odor, and appearance of such fruits help sales in wholesale and retail markets.

The fertilizer for fruit should be well balanced, and contain from 7 to 10 per cent. of Potash.

POTASH PAYS

SOIL & CROP SERVICE, POTASH SYNDICATE
H. A. HUSTON, Manager

42 Broadway

New York

in the course of a day or so, they eat into the tips until they are concealed and protected. Here they eat not only the tender tips but also burrow into the pith of the small twigs, causing the leaves to wilt and die. In the spring when wilted twigs may be easily noticed, the work of the twig-borer is more evident than at any other time of the year. A single larvae may go from one twig to another and the injury caused by only a few of them may be great.

NUMBER OF BROODS ANNUALLY

THERE are probably not more than two broods annually in Idaho and in the higher altitudes but a partial second brood. As already mentioned, the first brood attacks the foliage, but larvae of the second brood bore into the fruit, usually through the stem end, and feed freely on the fruit or inside the pit. The appearance of wormy peaches and prunes is too familiar to most orchardists to need description and a very large proportion of the gummy peaches and prunes which are a source of no small annoyance to packers and loss to growers are the result of injury caused by larvae of the twig-borer. Losses of as great as twenty-five per cent have been reported, but it is a significant fact that little or no loss occurs in orchards which are regularly sprayed with the dormant spray of lime sulphur.

APPEARANCE OF THE TWIG-BORER

WHEN fully grown, the larva is about three-eighths of an inch long, of whitish yellow or pink color and sparsely covered with fine, bristle-like hairs. The fore part of the body and the head are brown or almost black.

After the larva has become fully grown, it changes to the pupa, in which stage it remains for two or three weeks. The pupa is enclosed by a few threads of fine silk. The first brood passes the pupal stage in cracks or rough places in the bark, between fruits which touch each other and among trash and vegetation on the ground. The later brood is believed to pupate mostly in the depressions at the stem-ends of the fruits.

The adult of the peach and prune twig-borer is a small, gray moth about one-fourth inch in length and one-half inch from tip to tip of outstretched wings. Both front and hind wings have a fringed border. Moths are not easily observed and are rarely recognized by orchardists. Eggs of the first brood of moths are laid on leaf stems but those of the second brood are laid in the stem-end depressions of fruits and in crevices of bark between crotches. When first laid they are nearly white but before hatching change to yellow.

TOP-DRESSING TALK No. 5

Fertilizing for the Cover Crop

An early application of *Arcadian Sulphate of Ammonia* to the orchard will stimulate fruit bud formation, increase the amount of fruit set and enable the tree to carry a full crop of fruit to maturity.

In addition, the nitrogen and the sulphur will greatly increase the growth of the cover crop, which if plowed under, will build up the organic matter content of the soil.



The picture above shows the beneficial effect of this fertilizer on a cover crop of sweet clover.

Arcadian Sulphate of Ammonia

Arcadian is the ideal orchard fertilizer. It is fine and dry and can be distributed easily and uniformly by hand or machine. Being a non-leaching form of nitrogen it can be applied early in the spring without undue loss from washing by spring rains.

Sulphate of Ammonia is the well-known standard article that has done you good service in your mixed fertilizers for years past.

Arcadian is the kiln-dried and screened grade, made fine and dry for top-dressing purposes. Ammonia 25¼% guaranteed. Made in U. S. A.

Write Desk No. 9 for Free Bulletins. No. 8. "The Use of Sulphate of Ammonia in the Fertilization of Peaches" and No. 85. "Fertilizing the Apple Orchard"

FOR SALE BY

CALIFORNIA: San Francisco: Hawaiian Fertilizer Co., Pacific Bone, Coal & Fertilizing Co., Pacific Guano & Fertilizer Co., Western Meat Co., California Fertilizer Works. Los Angeles: Pacific Guano & Fertilizer Co., Pacific Bone Coal & Fertilizing Co., Agricultural Chemical Works, Hauser Packing Co., Hawaiian Fertilizer Co., Ltd., Southern California Fertilizer Co. OREGON: Portland; Swift & Co.

For information
as to application,
write Desk No. 9

The *Barrett* Company

Agricultural
Department

510 First National Bank Building, Berkeley, California

CONTROL METHOD

LIME-SULPHUR applied thoroughly to twig-borer infested trees just before the buds begin to open in the spring, is known to be an effective means of controlling this pest. At this time over-wintering larvae become active in their cells and are readily reached by the contact spray. The later the application is made before the buds open, the better will be the results obtained. By delaying the application of lime-sulphur until the time mentioned a single treatment will be effective in controlling both San Jose scale and the twig-borer.

Success is sure but it must be emphasized that it depends on the proper timing of application, correct strength of material and extreme care and thoroughness in the work done. One must use standard lime-sulphur solution of 32 degree or 33 degree Baume test. The proper dilution is at the rate of one gallon of lime-sulphur to eight gallons of water. It is important that every bit of twig, branch and trunk surface be covered.

The addition of arsenate of lead to the lime-sulphur solution has sometimes been recommended for the control of the peach and prune twig-borer but experiments and observations made in Idaho and other Northwestern states

show that this combination is unnecessary and creates needless expense. Attempts to control the pest with arsenate of lead sprays alone are likely to prove unsatisfactory. There are cases where such a spray has gotten results desired but repetitions of the same method may end in failure. This is probably due to the fact that borers emerge so irregularly in the spring that it is impossible to apply one poison spray which will be effective against all larvae coming out of their winter quarters.

Caring for the Tractor

TAKING a tractor into the field that has stood idle all winter without any care or inspection is to invite trouble. In calling attention to this phase of the use of a tractor, Tractor Farming has this to say:

"Keeping a tractor in first-class working order is not a difficult matter for the average man if he knows how to do it, provided of course, that he has a machine which is designed with easy accessibility in mind.

"It is not at all difficult to tighten the connecting rod or main bearings on a properly designed tractor, and a man of ordinary intelligence can do the job with a little instruction. Neither is it a difficult job to remove the carbon

from the combustion chambers, to grind the valves, remove the spark plugs, replace worn rings, adjust the magneto, breaker points, and numerous other little jobs which require but a few minutes for an experienced man, but which play a very important part in keeping a tractor on the job without delays.

"Time lost on account of trouble with any farm machine is usually a serious matter, as it nearly always interferes with the planting or harvesting of the crop and costs money. In the case of the tractor, which is used for more operations and more days per year than most other machines, it is even more important than with the rest of the equipment.

"With the large number of tractor schools which have been held during the past year and held by many state colleges, there is no excuse for any tractor owner not being capable of overhauling his own tractor. The instructions given in these schools is not only of value to the operator while the machine is in the field but it also qualifies the owner or operator to go over the tractor at odd times in order to put everything in shape."

Notwithstanding the advance in the price of nursery stock it is still profitable to plant well selected varieties of many of the tree fruits.

THE MARINE PRODUCTS CO., Inc.

TACOMA, WASHINGTON

(Three Manufacturing Plants)

HAWK INLET and PETERSBORO, ALASKA

Manufacturers, Distributors and Exporters of

BY-PRODUCTS, ANIMAL AND AQUATIC

In the Form of High Grade Concentrates for Cattle and Poultry

We Have Buying Agencies—

In touch with the market for raw products in Canada, the United States, South America, and the Orient. We buy, process, and sell the best.

We Also Supply Fruit Growers, Farmers, Dealers and Jobbers—

With organic fertilizers, made up of animal products, scientifically compounded—the premier fertilizers of the world, which do not deaden the soil, but improve it by invigorating the bacterial life, while at the same time furnishing in correct proportions the soluble plant food so necessary for quality and quantity production.

We Point With Pride to the Fact—

That growers who used our famous brands of Clarke's Special Orchard Dressing, our Potato Special, our Puyallup Berry Fertilizer, and other brands in former seasons quadrupled their orders during the past year. WHY?

Our Famous Puyallup Brand of Berry Fertilizer—

Has been imitated in name, but not in quality. See that your sacks of fertilizer have on them the green lettered tags of THE MARINE PRODUCTS CO.

Our Business Has Grown Great by the Results Accomplished—

It is what we sell; it is what you are interested in—RESULTS.

Write the Marine Products Co., Tacoma, for literature and testimonials.

Bits About Fruitmen and Fruit Growing

THE APPLE industry of the Pacific Northwest is in better shape relatively than any other agricultural industry, is the statement of J. S. Crutchfield of Pittsburg, Pa., president of the American Fruit Growers, Inc., a \$100,000,000 concern, which has large orchard holdings on the coast as well as in other sections of the United States. Mr. Crutchfield expressed this opinion at the annual meeting of the Spokane Fruit Growers' Company on a recent visit to the coast, and added that in the next five years he expected to see this industry attain greater prosperity than has been the case in the past five years. In discussing the apple industry in this region further Mr. Crutchfield said:

"The Pacific Northwest apple is an international apple. It's market is the world. South Africa, South America, Central America, Australia and Northern Europe are its natural market. Because it is an international fruit which will stand up under severe strains, such as cold storage to which it must be subjected. As it is and must be an international fruit and its market is the world it cannot be a small apple, such as is grown in the East. I believe that the big red apple which made the Northwest famous must be grown in the future if this section continues to hold its place in this world market and expand its output still further."

▲▲▲

AS the result of experiments conducted by D. A. F. Fisher, pathologist with the United States Department of Agriculture, located at Wenatchee, Wash., it is believed that he has discovered a method of keeping apples from two to three months longer than when packed in the ordinary way. The discovery consists in wrapping the apples in a specially prepared oil paper, which absorbs the destructive gases. The tests made with the different varieties of apples show that the oiled wrappers are particularly effective against scald, one of the storage diseases of apples that causes the greatest loss in the Pacific Northwest. The test which was considered the most successful in showing the results of the new method was made during the past winter with apples of the Grimes Golden variety. The specimens were picked September 20 and put into storage two days later. They consisted of fruit wrapped in the oiled paper and in the ordinary apple wrappers. When taken out of storage a short time ago, the apples wrapped in the oiled paper were found free of scald and in fine condition, while the others were in a bad state of decay. The Grimes Golden, the variety selected for the test, is not a late keeper and the fact that those wrapped in the oiled paper were found in good condition two months after their usual keeping season has convinced many shippers and growers who have witnessed the result of the experiment that a very important discovery has been made. The cost of the oiled paper is not excessive and it will be used by many growers during the coming apple shipping season.

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ABOUT 2,250,000 cases of Australian apples will be available for export during the coming apple shipping season, according to estimates published by the Canadian department of trade and commerce. It is doubtful, however, states the report, whether shipping facilities can be obtained for the movement of anything like this quantity. In fact, exporters do not anticipate that more than 1,250,000 cases can be shipped overseas owing to the lack of cold storage facilities on steamships now engaged in the Australian trade. The early varieties of Australian apples come on the market during the last week in February and the late varieties are picked toward the end of April.

▲▲▲

SAMUEL ADAMS, editor of the American Fruit-grower made a visit to the Northwest fruit-growing sections during the past month. Mr. Adams, whose home is in Chicago, made the trip to the coast for the purpose of getting first-hand knowledge of fruitgrowing methods and conditions in the box apple region, and also to interest fruit-growers on the coast in the national conference recently held in Chicago.

▲▲▲

RECENT advances in regard to the coming canning season are to the effect that a much lighter factory pack of canned goods will be put up this year than last. The reason assigned for the reduced pack this year is the heavy carry-over from last season. Prices for canning stock on this account are expected to rule considerably lower.

"You may be Sure" says the Good Judge



That you are getting full value for your money when you use this class of tobacco.

The good, rich, real tobacco taste lasts so long, you don't need a fresh chew nearly as often—nor do you need so big a chew as you did with the ordinary kind.

Any man who has used the Real Tobacco Chew will tell you that.

Put up in two styles

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Triangle Brand Liquid Asbestos Roof Cement is a composition of asphaltum, asbestos and other materials fused to a consistency of heavy molasses. It is absolutely waterproof and fire retarding. Comes in barrels ready for use. Applied cold. Anyone can apply it. Will positively make your warehouse waterproof. Saves money.

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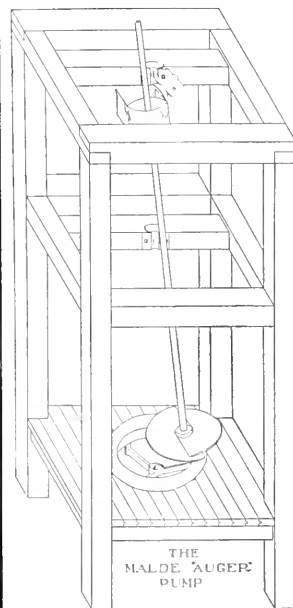
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Trees, Shrubbery,
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All Standard Varieties of
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Yakima and Columbia River Nursery Co.

Growers of Choice

FRUIT TREES

SMALL FRUITS and
ORNAMENTALS

Yakima, Washington

*"Yakima Grown" is
the best guarantee.*

Unique Home Collection

Alwild Strawberry	Better Canner	FREE
Productive Everbearing	15 Plants	\$.25
Sugar Strawberry	15 Plants	.45
Peerless Everbearing	15 Plants	.75
"New Race" Strawberry	15 Plants	.90
Duluth Everbearing	15 Plants	1.75
Lucky -1 Everbearing	15 Plants	5.00
Unique and one other	ALL PREPAID	\$9.10

Evergreen Plantation

NEW MEADOWS, IDAHO

Knowing Spray Quantities Important

By Leroy Childs, Superintendent Hood River Experiment Station

IN CONNECTION with the investigational work on sprays and spray practices carried on at Hood River some interesting figures have been gathered relative to the amount of diluted spray required to obtain effective control of the various orchard pests present.

On all the problems of spraying which come to the attention of the orchardist, the actual requirements of trees of different ages for different spray mixtures are least known and perhaps least seriously considered. To this lack of understanding can often be traced the failure to check the ravages of the many familiar insects and diseases. Thorough spraying is to be desired, but over spraying is a waste of expensive materials and time. Incomplete spraying, on the other hand, is a double disaster, a waste of materials and time, and a failure to control the pests. Every orchardist should more closely check up his average tree usage for every spray applied during the season. There is no more clear-cut method of telling just what has been done in the orchard, from the standpoint of spraying than an analysis of this sort. With sprays of a similar nature in an orchard of more or less uniform trees, a very high degree of uniformity in the number of trees covered should be maintained with each tank of spray applied. If this is not maintained, there is something decidedly wrong in the technique of the application. During years of light crops growers who "spray for fruit" in their codling-moth control are frequently at a loss to account for the many wormy apples present in picking time. A study of the average quantity of spray used per tree in an orchard thus sprayed as compared to a well-sprayed orchard usually proves a revelation of startling inadequacy. Spraying for fruit in the case of both apple-scab and codling-moth or for the control of other insects or diseases, for that matter is not an advisable practice. In the early applications it is almost impossible to determine accurately whether a tree has fruit on it or not. If the missed or partly sprayed tree turns out to have a box or even a portion of a box of fruit on it, a large portion of the fruit will be wormy. Not only is this fruit lost, but the very fact that a good number of worms have been propagated and have spread to surrounding well-sprayed trees results in a general increase in the percentage of wormy apples and a very

decided increase in the percentage of "stings."

During the summer applications, that is, after the trees have developed a large proportion of their foliage, the spray requirements for each application are about the same. In orchards where careful records of spray usage have been obtained we have found that associated with regular amounts of spray used is a very decided irregularity in insect and disease control. In numerous instances it has been observed that these irregularities—failure to use sufficient amounts of material (gallons per tree) in some of the sprays—has caused a loss through the increase in damaged fruit that would have more than paid the total spraying charges for the entire year.

AVERAGE SPRAY REQUIREMENTS FOR BEST CONTROL ON TREES OF DIFFERENT AGES*

Age of Trees	Miscible Oil Gallons per Tree	Summer Applications for Scab and Codling-moth	Fall Bordeaux
11	4.1	4.1	..
12	4.5	4.5	5.0
13	5.6	4.5	5.1
14	7.0	5.2	..
15	7.2	5.6	6.1
17	8.0	6.0	7.4

*Based upon information obtained in a number of successfully sprayed orchards during the years 1912, 1918 and 1919.

THE tree requirements for the different sprays used in combating our various troubles are quite varied. It has been found that in order to obtain a complete covering with the miscible oil spray used largely for the control of the leaf-roller in the Hood River Valley—and applied as a delayed dormant spray, much more spray must be used than is needed for the late spring and summer applications of arsenate of lead and lime sulphur for the control of codling-moth and apple-scab. The reason for this greater requirement is due undoubtedly to the fact that the twigs and branches must all be thoroughly covered if the desired results to be obtained. In so doing the tree must be very carefully worked over and in view of the fact that, contrary to the usual belief, oil does not spread easily, a good deal of spray is lost in obtaining a complete covering. In the case of seventeen-year-old trees studied, about two gallons more per tree is used with the oil spray than with the summer applications. The proportions were about the same in trees of other ages. Next in point of requirements comes the full bordeaux mixture used for the control of anthracnose. Here again the essential factor involved is the



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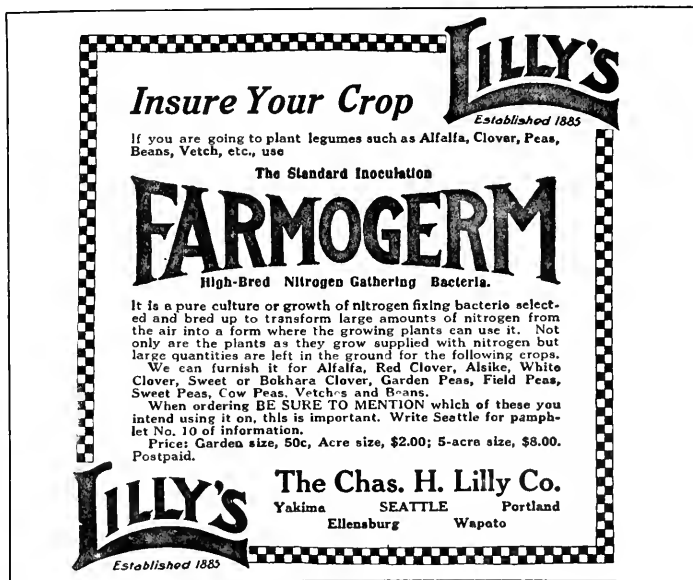
Mr. John T. Bartlett, in March 16 *Outlook*, says:
"The bushel basket furnishes many economies. Shipped to the farmer nested, carried thus to the farm and even to the orchard, the basket furnishes a saving in transportation cost without the subsequent necessity of putting together the packages."

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Established 1885

Insure Your Crop

If you are going to plant legumes such as Alfalfa, Clover, Peas, Beans, Vetch, etc., use

The Standard Inoculation

FARMOGERM

High-Bred Nitrogen Gathering Bacteria.

It is a pure culture or growth of nitrogen fixing bacteria selected and bred up to transform large amounts of nitrogen from the air into a form where the growing plants can use it. Not only are the plants as they grow supplied with nitrogen but large quantities are left in the ground for the following crops. We can furnish it for Alfalfa, Red Clover, Alsike, White Clover, Sweet or Bokhara Clover, Garden Peas, Field Peas, Sweet Peas, Cow Peas, Vetches and Beans.

When ordering BE SURE TO MENTION which of these you intend using it on, this is important. Write Seattle for pamphlet No. 10 of information.

Price: Garden size, 50c; Acre size, \$2.00; 5-acre size, \$8.00. Postpaid.

Lilly's

Established 1885

The Chas. H. Lilly Co.

Yakima SEATTLE Portland
Ellensburg Wapato

thorough covering of all of the twigs, branches and trunks, a procedure requiring more time and materials than is found necessary for the coating of foliage and fruit in the summer sprays. It has been noted that about a gallon and a half more spray is required in the autumn on old, bearing trees to cover them completely than is required on the same trees during the summer. The table shows the average amount of spray per tree applied in well sprayed

orchards of different ages in the Hood River Valley where very satisfactory results have been obtained.

As the summer approaches look out for sun scald on trees that have not sufficient foliage to shade their own trunk and main limbs. A little care will enable you to shade the threatened parts in some manner and thus avoid having damaged bark on the southwest side of the tree.

BETTER FRUIT

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Absorbing the Profits

As the season draws to a close for handling and distributing the 1920 fruit crop it becomes more and more apparent that the small margin of profit and in many instances losses that have been sustained by the fruitgrowers of the Northwest is largely due to the big advance in freight rates. This has been particularly the case with the box apple industry, the freight rate advance taking the difference between a loss and a profit to the growers.

Inasmuch as this industry is one of the most profitable in the way of revenue that the railroads handle from the Northwest and that its continuance will be jeopardized by the maintenance of these high rates, the railroads should take action to reduce them. They have already announced a reduction of the rates on lumber from the Northwest. Why not on fruit? With the rail lines absorbing all the profits of the growers it is not difficult to see what will happen to the fruit growing industry of the Pacific Northwest.

It is hoped that before another season for the heavy shipping of fruit rolls around that these prohibitive rates will be reduced. Let the railroads make the announcement of a reduction in the near future, thereby stimulating and reviving an industry that is second to none in making for prosperity on the Pacific Coast.

Farm Homes

In a statement recently made by Miss Abby L. Marlatt, director of home economics at the University of Wisconsin, she sounded an important note by saying that "farm homemaking is no less fundamental to the welfare of the nation than is farming." In taking up the subject of farm homemaking Miss Marlatt's idea is that the farm home should contain as many of the conveniences and comforts as possible in order that it will prove attractive to the younger members of the family in addition to lightening the burdens of farm women.

To illustrate the lack of modern equipment and the difficulties under which farm women work, Miss Marlatt shows that a survey of 10,000 farm homes disclosed the fact that the average working day of the farm housewife averaged 11.3 hours a day with practically no vacation. Kerosene lamps were found in three-fourths of the homes studied, while only one-third of them had running water and a still smaller number provided with hot water systems and other conveniences.

While the absence of these conveniences is not so great in a number of the orchard districts of the Northwest, still there is room for a great deal of improvement along this line, particularly in the way of water and light systems, which in many instances could be provided at a nominal cost. In these days when the young people in the agricultural districts are flocking to the cities it is just as important to keep the boy or girl on the fruit ranch as it is on the farm. One of the most effective ways to do it is to make their home life as attractive as possible, as well as to give the women of the household at least a partial release from drudgery, by the use of labor saving equipment. To raise the standard of the farm home farm women must have a certain amount of leisure.

National Coöperation

With the organization of coöperative fruit selling associations in many sections of the country the proposal to form a national organization, which has been undertaken by the American Farm Bureau Federation, follows out the ac-

tion that has been taken in regard to assisting the producers of many of the other soils crops in getting a better and more economical system of distributing and marketing their products. Organized along the right lines and with men of experience and intelligence in the fruit industry and in marketing at the head of it such an organization should prove of vast assistance to the local coöperative associations.

It will be necessary, however, for a more widespread organization of local coöperative fruit handling bodies than has yet been the case in order to insure success. While the Pacific Northwest has made long strides in this direction it needs the support of the Eastern fruitgrowing districts. Of late these Eastern districts seem to have become aroused in regard to coöperation and indications are that they will join in the movement to secure the organization of a nation-wide body that it is hoped will go a long way in its operations to solve many of the marketing and other problems that are now working to the disadvantage of the fruitgrower.

Spraying

The spraying season has commenced, although growers have been hampered considerably by weather conditions. However, from now on, the most important sprays will have to be applied for the various pests and growers should bear in mind that spraying is an important operation not to be looked upon lightly or neglected, but an insurance that means clean fruit and therefore profit at the end of the season.

Spraying is a subject that is very frequently called to the attention of the grower, so frequently, in fact, that it would seem that all that can be said about it had been said, and yet each year sees large quantities of diseased and inferior fruit harvested in even some of the most progressive districts. Reports also show that notwithstanding a more or less rigid inspection in many fruitgrowing districts a considerable quantity of it finds its way to market. If you are inclined to neglect some phase of orchard practice do not let it be in regard to spraying. Protect yourself and your orchard by getting the sprays on at the right time.

Controlling Brown Rot

(Continued from page 4)

started add 32 lbs. of ordinary sulphur, previously screened to take out foreign matter and break up the lumps. Stir vigorously to keep the material from "burning" and adhering to the bottom of the barrel, adding water as necessary until the lime is all slaked. For peaches it is well to stop the action at the end of 15 or 20 minutes by filling the barrel with cold water, but the spray can be improved for harder fruits by tightly covering the barrel and holding its contents hot for a longer period. Enough water should be added in any case to make it easy to screen into the spray tank for the removal of small particles that would otherwise clog nozzles and cause trouble in the valves.

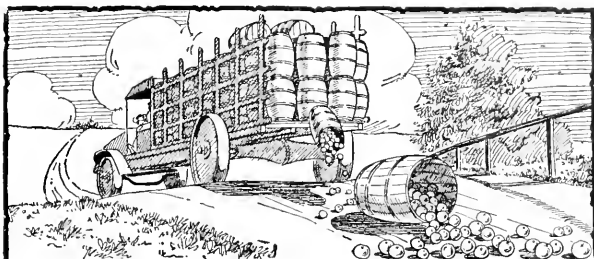
THE addition of a spreader or "sticker" is essential to best results with any spray material, more especially on smooth fruit surfaces, such as cherries and plums have. In the absence of a spreader the spray gathers in drops and "runs off" like water from a duck's back." With Bordeaux and self-boiled lime-sulphur various soaps may be used. A good spreader of this type is the resin fish-oil soap which may be made at home by the following formula:

Lye, such as used for washing 1 lb.
Resin..... 5 lbs.
Fish Oil..... 1 pint
Water 5 gallons

Dissolve the resin by heating in the oil in a large kettle. After this has partially cooled, add the potash; stir slowly and watch to prevent its boiling over. Then add a part of the water and continue boiling until the mixture will dissolve in cold water. Then add the remainder of the water. Use about one quart of the soap to 50 gallons of spray.

Soaps are not suitable for use with commercial lime-sulphur and even with Bordeaux and self-boiled lime-sulphur they are frequently objected to on account of the excessive foaming in the tank. Casein is not open to this objection and forms a very efficient spreader with any spray material. It is best prepared in a stock solution, as follows:

Take one pound of the ordinary commercial granulated or powdered casein that can be obtained through druggists or wholesalers and slowly stir it into a gallon of water in which has been dissolved three ounces of caustic soda or ordinary "potash lye," and bring the mixture to a boil. The same care must be used in adding the casein as would apply if flour were used, since sticky lumps that are hard to dissolve may otherwise form. For use take one quart of the resulting solution to 200 gallons of spray.



LOST, BUT YOU DON'T KNOW IT!

In actual use on an apple orchard

NITRATE OF SODA

increased the yield by 100 bushels. If you are *not* using NITRATE OF SODA you are losing part of your crop as completely as though you lost it off the end of your truck.

Write for book of results.

DR. WM. S. MYERS
Chilean Nitrate Committee

Los Angeles, California
231 Douglas Building



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Their Tiny Stomachs

Grasselli-Grade Insecticides cut them off in the "flower of their youth"—before their voracious appetites have ruined your fruit crop and income. Certain—positive—unfailing in results—when you spray with Grasselli Grade you are SURE of protection—you have put a padlock on your season's fruit income (so far as the insects and fungi are concerned).

Grasselli Grade Insecticides and Fungicides are absolutely unvarying in strength and quality—they must be so in order to earn the Grasselli label, to align with the world-wide Grasselli name and 82 years of chemical leadership.

Specify GRASSELLI GRADE when you order your spray material and INSURE your fruit crop. There's a Grasselli dealer near you.

THE GRASSELLI CHEMICAL CO., Cleveland
Founded in 1839



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WE SAVE YOU MONEY!

M. Martius Music House, Inc.

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Everything Known in Music

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MUSIC

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Us

TIME TO SPRAY

First application: When the buds are showing color, but before they open.

Third application: As soon as the "husks" have fallen.

Second application: As soon as the petals have fallen,

Fourth application: Three or four weeks before harvesting.

The Gasoline of Quality



Red Crown gasoline has well earned the right to be called "The Gasoline of Quality."

Its continuous chain of boiling points insures all of the qualities of a good motor fuel—readystarting, rapid acceleration, and maximum power.

You can get Red Crown gasoline wherever you see the "Red Crown" sign. Look for it on garages and service stations.

STANDARD OIL COMPANY
(California)

THE time to spray is a most important consideration, but no hard and fast rules can be given since much will depend upon the weather conditions and an orchardist must use his best judgment. For general insurance the above schedule is recommended and should be adhered to. In any event the first and fourth sprays should be applied. If the season is dry perhaps the second and third may be omitted, but if it is rainy they should by all means be included.



Fig. 3. Blossom blight of cherries, showing an advanced stage of the trouble where the fungus has worked back onto the stem. Note the mold growth on some of the specimens. This is the fungus which causes the disease and the spores are produced on the blossoms the same as on the fruit as shown in Fig. 1.

Further, if rainy periods intervene between the third and fourth applications listed above it would be a timely precaution to spray whenever the danger arising therefrom becomes apparent.

The control of the syneta leaf beetle is probably of more importance in avoiding loss from brown rot than is realized by many growers. This insect not only may carry the spores, but as a result of its feeding on the fruit and blossoms infection is facilitated. It is present in large numbers every season throughout Western Oregon and Washington. The spray program should therefore include a poison for the syneta. Lead arsenate at the rate of one pound of powder or two pounds of paste to 50 gallons in the second application listed above will be found effective.

Western Apple Industry (Continued from page 5)

first-class apples comes from the Northwest and awake to the fact that we have some real competition to meet and it can only be met by adopting the most up-to-date and systematic standardized business methods. We should grow larger, better fruit and considerably more care should be exercised in grading, sizing and packing. There is not a brand of apples that I now know of but what has

OTHER MYERS PRODUCTS PUMPS FOR EVERY PURPOSE MAY UNLOADING TOOLS DOOR HANGERS

MYERS SPRAY PUMPS

For economy spraying use MYERS SPRAY PUMP—and by economy we mean efficiency at a minimum of cost and labor. MYERS SPRAY PUMPS and SPRAYING ACCESSORIES have long been known for the excellent results they produce. They are considered standard in every fruit growing territory, and this is not snap judgment on the part of a few—it is the result of MYERS QUALITY in design, material used, workmanship and finish which insure dependability and excellent service.

SPRAYING TIME IS HERE

If you have not already made provisions to spray, it is not too late to do so. The spraying period now continues throughout the entire spring and summer, and MYERS DEALERS everywhere are waiting to supply you with the latest and most improved types of MYERS BUCKET, BARREL and POWER SPRAY PUMPS, complete SPRAY OUTFITS and ACCESSORIES for Spraying, Whitewashing, Coldwater Painting and Disinfecting. Our new Catalog, No. SP21, is just off the press. Besides showing the entire MYERS Line of SPRAY PUMPS it devotes 20 pages to reliable "How and When to Spray" Instructions. Write for your copy today. Your dealer will supply you with MYERS SPRAY PUMPS. Ask him.

F. E. MYERS & BRO. N 135 ORANGE ST. ASHLAND, OHIO.

For SPRAYING-PAINTING-DISINFECTING

Pacific Northwest
Distributors

Mitchell
LEWIS & STANTON

Portland, Oregon
Spokane, Wash.

BUY FROM THE LOCAL MITCHELL DEALER

WHEN WRITING ADVERTISERS MENTION BETTER FRUIT

and now is suffering from inferior packing house work.

The question of retail prices for our apples deserves serious consideration and careful analysis, followed by concerted action.

As a rule the jobber or wholesaler has played fair as regards profits and distribution, but the retailer, almost to a man, has not used good business judgment in his handlings of boxed apples. Usually his attitude has been to sell one box at a very big profit rather than five boxes at a reasonably fair profit and consequently the grower and consumer have suffered.

We are partly to blame for this in starting our selling season at too high prices. The public is led to believe we are charging too much and they naturally rebel and go on a buying strike. As a consequence we suffer throughout the season.

A notable example of the success of the opposite method is shown this very season with cranberries. The manager of the American Cranberry Exchange controlling a large percentage of all cranberries grown in the United States clearly saw the mistake others were making and pointed out to his grower the wisdom of the Exchange opening prices at \$8.50 per barrel instead of \$10.00, the price the growers wanted, with the result that the trade and public took hold readily, enabling price advances to be made continuously throughout the season. They remained for a long time at \$12 to \$15 per barrel and finished at \$21 and \$25 per barrel and this in the face of a big crop and notoriously dull times.

The public should be told and retold throughout the season all about our apples, perhaps not mentioning any particular brand, but featuring the best brands, varieties, sizes, uses, etc. Particular stress should be placed upon the proper season for different varieties.

We should drop local sectional jealousies and work in harmony for the good of all concerned. The press would be glad to help if given an opportunity.

We need the help and cooperation of the legitimate jobber and distributor more now than ever and they need us. We should gladly meet them more than half way, always remembering that no transaction is a complete success until all legitimate factors make a fair and equitable profit commensurate with the service performed.

The progressive dealer would welcome with great satisfaction the standardization of our grading, packing and selling methods.

It is sadly to be regretted that no more definite steps have been taken along the lines of coordinating the activities of the different highly developed apple growing sections of the Northwest.

Reap a Rich Return

PLANT DIAMOND QUALITY STOCK

For Best Bearing

GRAPES —Specially selected varieties that have been proved most suitable for Oregon.

BURBANK'S THORNLESS BLACKBERRIES —Sweet and luscious; a heavy yielder and a rampant grower; the coming Oregon berry.

OREGON CHAMPION GOOSEBERRIES —Berries large, pale green, sweet, bush strong, prolific grower.

LOGANBERRIES —Partake of the flavor of both the blackberry and the raspberry. Ripen early.

STRAWBERRIES —New Oregon, Gold Dollar, Marshall, Magoon, Clark Seedling and other vigorous Western varieties.

RIVERSIDE GIANT RHUBARB —Unequaled for yield and quality, crisp, tender, free from stringiness.

CURRANTS —Many splendid varieties of this profitable, easy grown berry.

PERENNIAL AND ANNUAL BEDDING PLANTS —We have for early delivery a splendid variety of fine plants. Order now.

VEGETABLE PLANTS —We can supply all of the leading varieties in almost any quantity. Order early.

ROSES —The Famous "Diamond" Quality are large, sturdy, two-year-old, field-grown roses that will give you splendid flowers the first season.

Write for our Catalog No. 201, which gives full information of a very helpful nature.



Quality Products

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F.C. STETTLER MFG. CO.

PORTLAND, OREGON

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100 Per Cent Spray

Use your old Bean Rig, if you have one. Simply add our subframe and power-take-off and you'll have a 100 per cent spray rig.

You'll do your work faster and better.

Lower your costs. Spray the GMC Way.

Seattle
Spokane

ELDRIDGE *Quick* **SALES CO.**

Yakima
Walla Walla

GMC on a Truck Is Like U. S. A. on a Bond



The American Beauty Dust Sprayer

For Orchard, Vineyard and Farm

100% Efficient

It is the *fastest*, most thorough and economical dust sprayer ever built.

It is the standard of efficiency in sulphuring vines.

It is absolutely unequalled in the control and eradication of red spider.

Our method of dust application is the most effective protection against the codling moth.

Our Nicotine-Sulphur dust is instant death to aphids, thrips, leaf-hopper and similar insects.

Our method of control and concentration of the dust saves more than half the material.

We Invite Correspondence

The California Sprayer Company

6001-11 Pasadena Avenue

LOS ANGELES

My thought would not be to attempt "one big union" idea, but rather the bringing together of all interests on some common ground of mutual helpfulness, where the problems confronting the industry could be freely and fairly discussed. By so doing, everyone would benefit and the producer and consumer most of all.

At the present time the various apple growing sections are in a state bordering on "armed neutrality." We should not lose sight of the fact that we are all working to the same end. What helps one, helps all and vice versa.

The biggest apple crop year for the Northwest appears to be just ahead of us. Are we suitably fortified to meet the issue? Ours are individual problems to be collectively worked out.

Northwest Fruit Notes from Here and There

WASHINGTON

THE Yakima Fruit Growers' Association announces an increase in its capital stock from \$150,000 to \$300,000.

THE annual report for horticultural district No. 1, comprising Walla Walla, Columbia, Garfield and Asotin counties, recently completed shows that 908 cars of fruit were grown there last year.

DURING the latter part of the apple shipping season in the Wenatchee district an unusual demand for Winesaps of the larger sizes was prevalent. As a result a high premium was offered for the big sizes.

EARLY estimates of the peach crop in the Yakima valley are to the effect that it is below normal, owing to the fact that many trees injured in the 1919 freeze have not fully recovered and did not make sufficient wood growth in 1920 to set fruit spurs.

CLAIMING to be the center of the strawberry growing industry in Washington, Centralia is planning an annual strawberry festival. The event, which will be held during the early part of June, will be put on under the direction of the local chamber of commerce. Between 500 and 600 acres of strawberries are now tributary to the Centralia district.

APPLE box prices are approximately 30 per cent lower this year than at the corresponding time in 1920, according to the recent announcement of a box making company in Spokane. The wholesale price quoted is from 14 to 17 cents, while at the same time last year they were 24 cents.

ACTION taken by the members of the Yakima Horticultural Union will result in making an assessment of two cents a box on all fruit handled by the organization this year for the purpose of starting a building fund. The financial report of the union shows assets of \$433,115. The property and plants are valued at \$286,556, and the equipment at \$30,151. Its profits and surplus at the end of the year were estimated at \$20,426.

THE total value of the fresh fruit crop grown in the Yakima valley during the season of 1920 was \$16,065,540, according to statistics recently compiled. Of this amount the apple crop totalled \$11,792,500; pears, \$1,982,200; cherries, \$211,200; plums and prunes, \$142,800; peaches, \$275,745; strawberries, \$95,000; grapes, \$42,000; cantaloupes, \$490,000; watermelons, \$45,000. The balance of the amount was received from mixed shipments of fruits sent out by express and parcels post.

Food and Beverage

Make no mistake! Nothing can take the place of Ghirardelli's Ground Chocolate—at your table or on your dealer's shelves. Because Ghirardelli's fills a daily household need—and fulfills every essential of food and beverage.

Ask for Ghirardelli's Ground Chocolate at the store where you do your trading. Never sold in bulk but in cans only. In this way Ghirardelli's retains its flavor and strength—the two most important elements of good chocolate.

Say "Gear-ar-delly"

D. GHIRARDELLI CO.
Since 1852 San Francisco



GHIRARDELLI'S Ground Chocolate

NICE BRIGHT WESTERN PINE FRUIT BOXES AND CRATES

Good standard grades. Well made. Quick shipments. Carloads or less. Get our prices.

Western Pine Box Sales Co.
SPOKANE, WASH.
Catalog mailed on request.

Our 1921 Annual Catalog
is up-to-date and tells all about the best SEEDS, PLANTS & TREES, INCUBATORS, FOODS and SUPPLIES, SPRAYS, PUMPS, FERTILIZERS, Etc.

A reliable truthful guide for Western buyers. Ask for Book No.
ROUTT EDGE SEED & FLORAL CO.
145 Second St., Portland, Ore.



Northwest Orchard Ladders

"The Quality Line"

For Sale by
Leading Dealers Everywhere

Northwest Fence and
Wire Works
PORTLAND, OREGON

Free Spray Calendar Tells When to Spray-What to Use

The Dow Sprav Chart is the result of years of experiment and research. It tells how to care for apples, cherries, plums, grapes, currants, gooseberries, peaches and other fruits—explains insect enemies and disease of potato, tomato, cabbage and vine crops. Directs the mixture of all spray materials, tells the proper time for spraying and how to apply each particular spray. You should not be without this Calendar if you grow fruit of any kind. We will gladly send it free. Quality brings the high price and quality is not possible without spraying. Write for this free chart today.

Dow Powdered

Lead Arsenate

Extremely light and fluffy—Dow Powdered Lead Arsenate possesses many advantages over the heavier and more granular varieties. It mixes so readily and remains so well in suspension that it entirely covers foliage with a milky, filmy coating. Because it reaches and covers every part of foliage and branch—because it sticks where it touches and because of its high content of arsenic, it has a deadly effect on all forms of foliage eating pests. Dow Powdered Lead Arsenate is a great economy and a great convenience. Managers of large orchards and directors of state stations have used this product for years and now purchase in carload lots.

Packed in ½, 1, 5, 10, 25, 50, 100 and 200-pound containers. Sold through our dealers or direct where we are not represented.

Ask for folder describing all Dow Spray Materials. The line includes Dow Powdered Lead Arsenate, Dow Powdered Lime-Sulphur, Dow Lime-Sulphur Solution, Dow Paste Lead Arsenate, Dow Powdered Calcium Arsenate, Dow Powdered Bordo, Dow Powdered Bordo-Arsenate. These are the finest spray materials known, for the control of vegetable and orchard pests, and are used by the world's leading orchardists and state departments in carload lots. Send coupon below for our free Spray Calendar.

THE DOW CHEMICAL CO.

MIDLAND, MICHIGAN, U. S. A.

Trade



SEND FREE SPRAY CHART TO

Send
This

TREES AND SHRUBS



Fruit trees budded from bearing orchards. Apple, Pear, Cherry, Peach, Plum, Prune, Apricot, Quince, Grape Vines, Shrubbery, Plants, Raspberries, Blackberries, Logans, Dewberries, Asparagus, Rhubarb, Flowering Shrubs, Roses, Vines, Hedger, Nut and Shade Trees. Carriage paid. Satisfaction guaranteed.

WASHINGTON NURSERY CO.

Toppenish, Washington.

Salesmen everywhere. More wanted.

NOW is the time to send to

Milton Nursery Co.
MILTON, OREGON

For their 1921 Catalog
Full Line of Nursery Stock
"Genuineness and Quality"

OREGON

AUTHORITIES on cherry marketing in Oregon state that they do not expect the price of cherries this year to reach the sensational figures of 1920, but that they will not drop to pre-war prices. A price of 8 cents a pound is predicted for the coming season.

▲ ▲ ▲

REPORTS from the various fruitgrowing districts in Oregon are to the effect that weather conditions have been extremely favorable for both orchard and bush fruits and that the unusual number of fruit buds indicate abundant crops this year. Fruiting plants and trees of all descriptions are much more forward than usual and the only possible drawback feared now is that late frosts may do considerable damage on this account.

ACCORDING to the annual report of General Manager A. W. Stone of the Hood River Apple Growers' Association its business for the year will total \$2,476,899.12. The invested capital of the organization is \$332,345. During the past year the association handled a total of 1,052,969 packages of fruit, apples leading with 942,458 boxes. The average price for all varieties of apples for the 1920 crop is given at \$1.60 per box as compared to \$1.98 in 1919. An abundance of smaller sizes in 1920 and additional transportation charges are given as accounting for the reduction in the price during the past season.

▲ ▲ ▲

ALTHOUGH it costs but 1½ cents a pound to lay Oregon prunes down in the markets of Europe by shipping by way of the Panama Canal as compared to 2¾ cents by rail through New York, it is stated that on account of the excessive heat and humidity in the canal zone it has been found hazardous to ship the large sizes through the canal, except under refrigeration.

▲ ▲ ▲

IN a campaign to clean up neglected orchard districts of Douglas county, County Fruit Inspector Armstrong recently destroyed 40 to 50 acres near Sutherlin and will remove others that are a menace to the rest of the fine orchard district in that county. Most of the orchards destroyed were the property of non-residents. Douglas county now has over 10,000 acres in tree fruits and is making a rapid development in the berry industry.

LOOK FOR THE LABEL



How many times have you
seen just such a request?

Much space and money is
devoted to making people
look for the label, and yet
the label itself is not given
the thought it deserves.

When the true function of
the label, the selling and
identification value it
possesses is realized, more
care will be given to the
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SAN FRANCISCO

THE signing of the co-operative marketing bill by Governor Olcott now makes it possible for five persons to organize a co-operative association. One of the salient features of the law is that "no association complying with the terms of this act shall be deemed a combination in unlawful restraint of trade or an unlawful monopoly or an attempt arbitrarily to lessen competition or fix prices." The law also provides that in the event of a breach or threatened breach of contract by a member, the association shall be entitled to an injunction to prevent the further breach of contract.

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ACCORDING to a statement recently issued by F. L. Kent, in charge of the state bureau of crop estimates of the United States Department of Agriculture, the total value of the fruit crop production in Oregon in 1920 was \$15,787,803 and the total acreage, 106,831 acres. The acreage of the various fruits is given as follows: Apples, 48,565; pears, 9,583; prunes, 26,516; cherries, 4,115; loganberries, 5,427; strawberries, 3,500; raspberries and blackberries, (not including wild), 4,500; cranberries, 125; miscellaneous fruits, 1,500; nuts, 3,000. In compiling these figures the report states that the acreage is based on the returns made by the county assessors to the state tax commission with such additions as were considered warranted after correspondence with most of the assessors.

▲▲▲

IDAHO

PROSPECTS for a big fruit crop in Latah county, Idaho, are said by fruitgrowers in that section to be particularly bright. The winter in Idaho has been the mildest in many years and the trees generally throughout the state are in fine condition. Last year the crop was light. Latah county is one of the best strawberry districts in the Inland Empire, the acreage around Moscow and Viola being particularly large. Unless frost damage occurs one of the largest crops of fruit ever shipped out of the state is anticipated this year.

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THE Department of Bacteriology of the Idaho Agricultural Experiment Station announces that it prepares cultures for all leguminous crops. The cultures are prepared by thoroughly trained men and sent out with full directions as to their use by the farmer and orchardist. Last year the department sent out sufficient cultures to inoculate 13,211 acres and estimates of the benefits from their use are from 25 to 75 per cent in a majority of the cases.

"The Wise Men of Appletree Town"

—are the men who choose their banking connection with the same discrimination they use in pruning. The First National Bank, because of its size and comprehensiveness of its departments, is particularly equipped to offer the horticulturist the most in banking service.

Its facilities and the personal interest of its officers are at your disposal.

The
First National Bank
OF PORTLAND, OREGON

The first national bank west of the Rocky Mountains

Your Crop Depends Upon the Spray Material You Use!

So Does the Producing Life of Your Orchard

Therefore, you cannot be too careful in the selection of your materials. ORCHARD BRAND DRY POWDERED ARSENATE OF LEAD is the outgrowth of years of scientific experiment, laboratory tests, extensive field demonstrations and long use by successful commercial fruit growers.

It is always uniform, high in concentration, adhesive, lasting and spreads evenly without collecting in splashes. Its results show in clean, perfect fruit. A thorough coating on the leaves during the late summer and fall will prevent many worm "stings" and wormy fruit. Some people may be able to afford gambling on some things, but mighty few fruit growers are willing to risk a crop failure by taking chances on spraying materials.

Our appeal is to the thoughtful fruit grower who fights shy of unsupported claims, and demands to be shown.

To such fruit growers we offer Orchard Brand Dry Powdered Arsenate of Lead as a crop and tree protection. It has been proved effective. Its results are known. We shall be glad to give you the names of many successful fruit growers who are enthusiastic about its results. Suggestion: Write for the booklet. Also write for Bulletin No. 3 on Dormant Spraying of Deciduous Fruit Trees.

Other spray materials, for specific purposes, we recommend are:

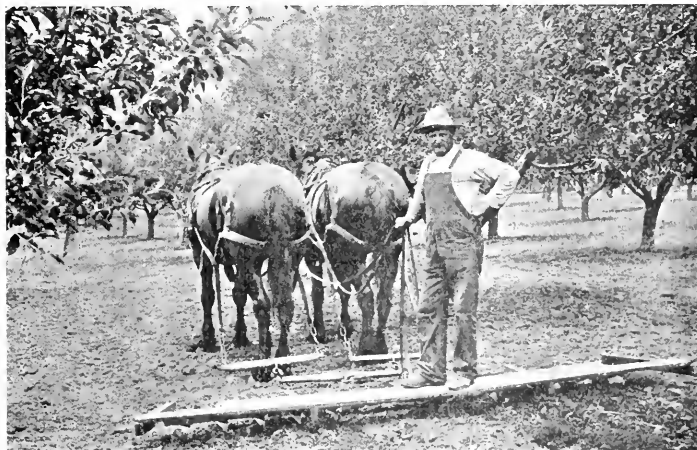


Dry Powdered Arsenate of Lead
Packed in 4 lb. paper bags (48 and 96-lb. cases) and in bulk (200-lb. drums).
Standard Paste Arsenate of Lead
Atomic Sulphur
Bordeaux Mixture Paste
Dry Powdered Bordeaux Mixture
Lime Sulphur Solution
B. T. S. Dry Barium Sulphur Compound
Universal Brand Dormant Soluble Oil
Universal Brand Miscible Oil
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Liquid Whale Oil Soap

GENERAL CHEMICAL COMPANY

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The Kimball Cultivator

at work in an orchard at Morrisania, Colorado.

This tool is the greatest weed radiator and mulch producer ever made. Its blades cut three to four inches under the surface, pulverizing the soil, cutting weeds and leaving the surface smooth. Write for catalogue and prices direct to the manufacturer.

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Treat Your Soil With

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It will increase your crop in some instances up to 500 per cent, prevent wire worms, smutty grain and potato scab. For Lime-Sulphur Solution use DIAMOND "S" BRAND REFINED FLOUR SULPHUR. For dry dusting use ANCHOR BRAND VELVET FLOWERS OF SULPHUR. Sold by leading dealers. For rodent control use CARBON BISULPHIDE. Write for circulars 6, 7 and 8, prices and samples.

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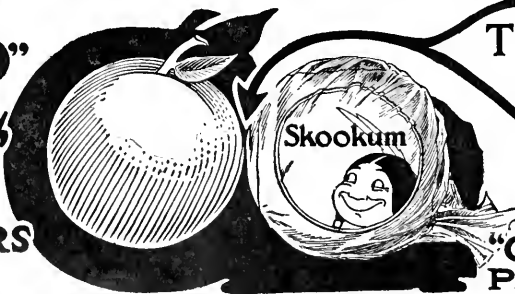
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fruit
WRAPPERS



This
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"CARO"
PROTECTS

"Caro" Protects—"Caro" Prolongs the Life of Fruit—Why?

CHEMICALLY TREATED, "Caro" from DessiCARE (to dry up)

FRUIT MATURITY is retarded by cold or refrigeration and hastened by heat or atmospheric exposure.

The soft fibrous silk-like texture of "Caro" provides just sufficient ventilation to retard the ripening process.

FRUIT DECOMPOSITION starts from a bruise which opens tiny holes and permits juice to escape and BACTERIA to enter. "Caro" clings closely and dries up the escaping juice. "Caro" ingredients harden the spot, kill the BACTERIA, arrest the decomposition.

United States Distributors, AMERICAN SALES AGENCIES CO., 112 Market Street, San Francisco, California

With the Poultry

CARE OF BREEDING FOWLS

POULTRY specialists connected with the United States Department of Agriculture advise that if cockerels or pullets are to be used in the breeding flocks they should be well matured. Hens, according to these specialists, are better than pullets. They lay larger eggs which produce stronger chicks. Yearling and two-year-old hens are better than the older ones. Pullets, if they are used as breeders, should be mated with a cock rather than a cockerel. If a cockerel is used he should be mated with pullets. Generally well matured cockerels will give better fertility than cocks.

When possible free range should be given to the breeding stock. It is considered better to provide it during the fall and winter before the breeding season, but if this is not possible, free range just preceding and during the breeding season will be of great value. Birds on free range will get more exercise and will therefore be in better health to give higher fertility, better hatches and stronger chicks.

Breeding flocks need careful watching to make sure that the fowls keep in good breeding condition. The birds and houses should be examined often to see that they are not infested with lice or mites. Either of these pests in any numbers will seriously and often totally destroy fertility.

In feeding the breeding flock the breeders should be fed so as to keep them in the best of condition to produce eggs. Any good laying ration is suitable for this purpose. A point that should not be overlooked is to examine the breeding male after feeding to see that his crop is full and that he is not growing thin. This should be done because some males will allow the hens to eat all the feed with the result that they get out of condition.

Provide the breeding stock with a house that is draft proof, yet well ventilated and dry. With the above precautions observed the result should be a high percentage of vigorous, strongly-bred chicks.

FEEDING YOUNG CHICKS

WATER and fine grit is the first food that should be given young chicks if they are artificially hatched. This should be given from 40 to 60 hours after they emerge from the shells. If the chicks are being brooded with hens the first grain and grit may be given at the same time. One of the best grain feeds for young chicks is chicken rolled oats which is fed in small quantities from four to five times a day for the first three or four days. At the end of this time any good brand of commercial chick feed may be gradually added to the oats, until in a week the larger part of the ration is commercial chick feed. In two weeks the rolled oats may be discontinued entirely.

The young chicks should be kept active from the start as activity is essential to their health and development. By feeding them small quantities frequently they are kept moving and not liable to become chilled. This frequent feeding in little amounts applies to their care during the day. At night they may be given all they will eat. It is not good practice to give chicks under the age of five days a mash of any kind. Grains cracked fine are the best tissue and muscle builder for young chicks. While there are other ways of starting to feed young chicks this method is one of the most successful used by expert poultrymen.

POULTRY NOTES

IF you intend to sell broilers they are more profitable at a pound and a half than when larger.

SUNFLOWERS planted along the edge of the poultry yard make shade in summer and excellent feed in the fall and winter.

IN building nests make them big enough so that the hens can get in and out without breaking the eggs. The entrance to the nests should be made in the back, so that they will be dark.

TOO much care cannot be given to cleanliness in the poultry house and yard. Clean nests are very essential in producing clean eggs. Change the nest material quite frequently and as a precaution against insects burn the discarded material.

A LITTLE salt added to the sprouted oats will be relished by poultry as a change.

IT IS well to remember that it is the early hatched pullets that produce eggs in the fall and winter when prices are high.

A TABLESPOONFUL of charcoal added every other day to the soft food of fowls will brighten up their combs and tone up their systems.

IT IS interesting to note that it is the heavy laying breeds of chickens that lay a white egg. The general purpose breeds lay brown eggs.

IF YOU have a flower garden save the poultry droppings to fertilize it. There is no better fertilizer to help in growing fine flowers.

CLOVER and alfalfa leaves thrown in the litter will be good food for the flock until they can get on the range in the spring or be given some other form of green food.

ALMOST as soon as the young chick can eat it will drink water. A bountiful supply of pure, fresh water is therefore necessary at all times. See that it is placed where the chicks can get at it easily.

TWO PLUMP a dressed fowl dip it for ten seconds in water nearly or quite boiling hot and then immediately plunge it into cold water. It should then be hung in a cool place until the animal heat is entirely out. The fowl will be given a much more attractive appearance for market by this process.

THE Oregon Agricultural College experiment station calls attention to the fact that hens fed for egg production should get feed containing the food elements found in the egg. An analysis of the egg shows that it is composed of ash 12.2 per cent; water 65.7 per cent; protein 11.4 per cent; and fat 8.9 per cent. The hen cannot counterfeit her product, so must be supplied with the necessary raw materials or she cannot manufacture the finished product.

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Fast Freight Service Between

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LOGANBERRY plants for sale direct from the grower. J. P. Aspinwall, Brooks, Oregon.

CHOICE Loganberry Plants, healthy stock. Reaming plants. Write for quotations. R. C. Denning, Estacada, Oregon.

STRAWBERRY plants, Marshall, Gold Dollar, Ideal, \$5 per thousand postpaid. John Myers, Rochester, Wash.

SEND FOR OUR NEW PRICE LIST on fruit trees, berry bushes, shade trees and roses. Krause Nursery, Spokane, Washington.

CORY Thornless Mammoth Blackberry, originated here at Mountain Pass Ranch. Strong plants, \$3 dozen, postpaid; also Phenomenal, Loganberry, Gooseberry, Currant and Giant Crimson Rhubarb. G. S. Wills, Jamestown, California.

STRAWBERRY plants, 100,000 Gold Dollar and New Oregon, \$3 per 1,000; Cuthbert and Mari-boro Raspberry plants, \$2.50 per 100. Lawson Nursery, Gates, Oregon.

SUPERB and PROGRESSIVE EVERBEARING strawberry plants will solve your fruit question; 100 plants should give you 100 to 200 pints berries this season if planted early in good soil, kept clean, moist and runners off. They come well packed to you, guaranteed, inspected and prepaid by insured parcel post at: 100, \$1.40; 500 at \$6; 1000, \$11; 2 Lucrertia dewberry plants free with first 1000 orders; Lucrertia dewberry plants, 25¢ per dozen, prepaid. N. B. Matthiessen, Model Fruit Farm, Emmett, Idaho.

FARMS FOR SALE

WANTED—To hear from owner of good ranch for sale. State cash price, full particulars. D. E. Bush, Minneapolis, Minn.

WANT to hear from parties having farm for sale. Give particulars and lowest price. John J. Black, 197th St., Chippewa Falls, Wisconsin.

CUT-OVER and Developed Lands, 15 to 25 miles N. E. Spokane; extra good soil; spring brooks; grows grain, vegetables, hay, fruits; several developed ranches; few stock ranches; \$10 to \$20 acre; 10 years' time, 6 per cent interest. Free lumber. Write owners for free book. Edwards & Bradford Lumber Co., Elk, Washington.

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BABY CHICKS, six varieties; best stock; prices reasonable. C. N. Needham, Salem, Oregon.

DAY-OLD CHICKS for Sale. O. A. C. White Leghorns; also eggs for hatching. J. L. Russell, Rt. 3, Corvallis, Oregon.

LIGHT BRAHMA. Bred to lay, winners wherever shown, stock and hatching eggs. Chas. Bylsma, Route 1, box 278, Seattle, Wash.

BUFF LEGHORNS and Thompson Ringlet Barred Rocks, Cockerels, \$5.00. Circular free. Bush Farm, Rt. 3, Portland, Oregon.

MINORCAS, black, white; utility and exhibition. Eggs. Catalog free. C. E. Murray, route 1, San Diego, Cal.

S. C. WHITE LEGHORN CHICKS May 2 and 24 delivery, \$15.00 per 100. Standard Poultry Farm, Monmouth, Oregon.

TRAPNESTED BARRED ROCK and White Leghorn eggs and chicks, \$1.50 per 15; \$8.00 per 100. Lendell Stock and Poultry Farm, Elmira, Oregon.

A FEW choice Cockerels—R. I. Reds and Whites, both combs. Dark red and pure white. High grade quality. Show winners. Bred from best strains in America. Mammoth Toulouse Geese—Winners. Mammoth Bronze Turkeys. Bird Bros. strain. Egg orders solicited. Highland Fruit and Poultry Ranch, J. Nonnenmacher, R. 3, Yakima, Wash.

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MEN with proven ability capable of selling a line of high grade nursery stock on a commission contract. Weekly cash advance. Splendid territory may be had by answering immediately. SALEM NURSERY CO.

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3-TON Buick truck, pneumatics in front, solids in rear; mechanically good. Old price \$475. Now \$350. Terms.

USED CARS—THAT'S ALL.

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MISCELLANEOUS

THE CUTLER FRUIT GRADER is the LEADER Nearly 1,000 now in use. The market demands well-sized fruit. Use a CUTLER GRADER and better your pack. Built for both box and barrel packing—in small and large models. Send for literature. Cutler Mfg. Co., 353 E. 10th St., Portland, Oregon.

KENTUCKY's extra fine chewing and smoking tobacco. Aged in bulk, 2 years old; rice and mellow. Long silky leaf; best grade, 15 pounds, \$6.80; second grade, 10 pounds, \$4, postpaid. Satisfaction guaranteed. Reference, First National Bank, Bardwell. Adams Brothers, Bardwell, Ky.

Portland, Oregon, Feb. 27, 1921.
Better Fruit, Portland, Oregon.

Gentlemen: Will you kindly change my local adv. in your paper to read as enclosed. If there is any extra charge please send statement.

I find that inquiries have cost me less for each one than any other medium I am using. I am using five others.

Respectfully,
CARROLL D. BUSH.

GROW Ginseng, \$12 per lb.; many others. How to know them. How to grow them. Send for Free Instruction Book and Price List. Twitchell Co., West Milan, N. H.

WANTED—A position on a farm for the summer, by a young man of experience from Ohio. Prefer a place near Spokane. Best of references. State wages. Fred Sprinkle, Polk, Ohio.

TOBACCO—Kentucky's Homespun Smoking or chewing; mild or strong; fine grade; aged and mellowed, like old wine in the cellar; 10 lbs., \$3.50, 15 lbs., \$4.75, 5-lb. package, \$2.00, postpaid. Reference First National Bank, Walpole Brothers, Murray, Ky.

U. S. NAVY TENTS SPECIAL—While they last—9x9, 12-ounce at \$12.00. These are fine value and make pretty cheap housing for your extra help. Also have limited number tent flies—fine for wagon covers—10x15, \$9.00. Alaska Junk Co., 203 Front St., Portland, Oregon.

ARROW CARBOLINEUM kills chicken mites in poultry houses. Preserves wood against rot and premature decay. Write for circular and prices. Carbolineum Wood Preserving Co., 222 E. Water St., Portland, Oregon.

BOOKKEEPER—Learn complete elementary bookkeeping in your spare time at home. Makes income tax reports easy. Only \$17.50. Write for terms. The Lincoln Institute, Spokane, Wash.

Baby Chicks from the Famous O. A. C. Strain

Eggs from 221-egg hens mated to cockerels from 300-egg hens. All chicks tested and guaranteed free from white diarrhoea.

Deliveries begin February 15, 1921.

PORTLAND SEED COMPANY

180 Front Street Portland, Oregon



Yakima Expects Big Crop

REPORTS from the Yakima valley are to the effect that fruit of all varieties has wintered exceedingly well and prospects for a bumper crop this year are very bright.

Barring the unforeseen, authorities who are in touch with the fruit crop prospects in this region this year estimate that the apple crop there will be close to 12,000 cars. This estimate was recently made by the state department of agriculture workers who also estimate that it will require 9,000,000 boxes to pack out the 1921 crop. If this estimate proves to be anywhere near accurate it will require 1,500 cars of lumber to make Yakima's apple boxes, while 4,500,000 pounds of paper will be necessary to provide fruit wrappers. Its expenditure for boxes alone is expected to be considerably over \$1,000,000 and the bill for fruit wraps to total over \$400,000.

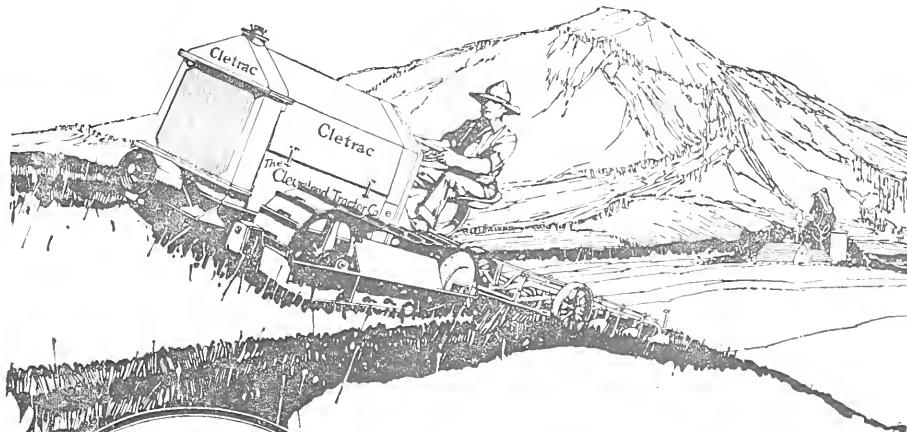
Yakima's total fruit shipments during the past season approached the 10,000 car mark with a valuation of over \$12,000,000.

Traung makes it easy to get label and carton service Quick

There's a Traung-trained man less than 12 hours by mail from you—this is localized service by a coast-wide institution

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Cletrac

**TANK-TYPE
TRACTOR**



Hard this
way but—



Easy on a track
The Cletrac Way

Specifications

Horsepower: 12 at draw-bar, 20 at belt pulley.
Length: 96 inches.
Width: 50 inches.
Height: 52 inches.
Weight: 3455 pounds.
Turning Circle: 12 feet.
Traction Surfaces: About 800 square inches.
Center to Center of Tracks: 38 inches.
Belt Pulley: Diameter, 8 inches; face, 6 inches.

This Year You Want Results

Half-way methods won't "get by" this year. You need results and profit—*more work at cheaper costs.*

And here's the very reason that now more than ever before you need Cletrac on your farm.

Cletrac has proved itself on every Pacific Coast farming job.

Every orchard man knows its marked success in orchard work. Low-set, smooth-bodied, short-turning—Cletrac works close to the trees, leaving no patches for horses to finish up.

On any draw-bar work—plowing, discing, drilling, harvesting, hauling—no matter what the job and no matter what the soil—even soft sand, tulle, volcanic ash or gravel—in good condition or bad, Cletrac works when you need it and finishes on time. This tank-type tractor lays its own endless track and gets a firm grip on any ground.

When it comes to tough jobs—plowing "nigger wool" or up-grade work in the foothills—Cletrac has the power and low center of gravity to perform in many cases where even horses would find it hard to satisfy.

Add to this Cletrac's all-the-year, all-purpose ability on draw-bar and belt work and you'll know why every Cletrac owner will tell you that Cletrac has more than made good for him and will for you.

You will find real value in our booklet—"Selecting Your Tractor." Write for it today and see your local dealer.

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"Largest Producers of Tank-Type Tractors in the World"

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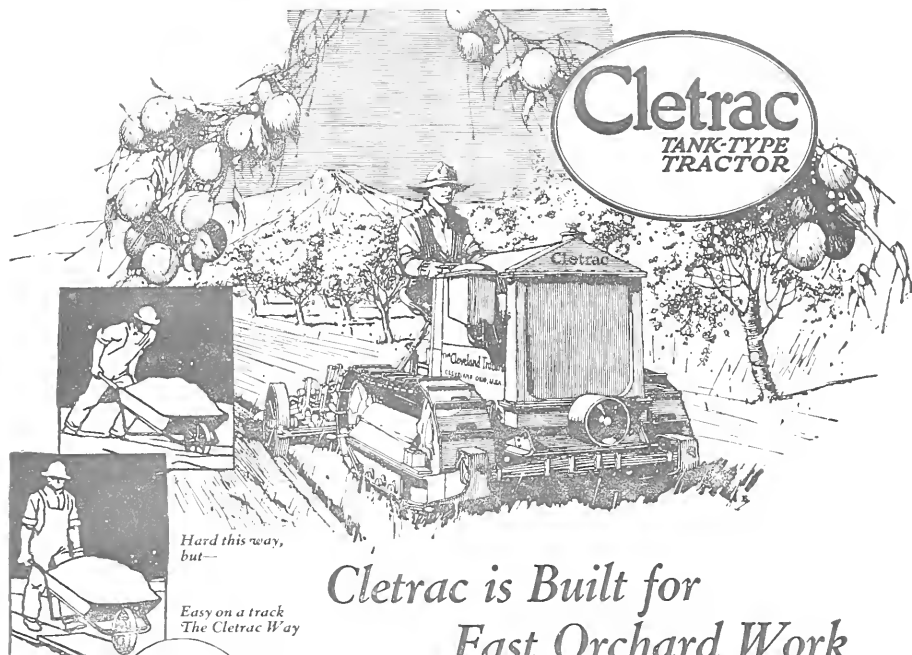
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An Early Variety That Is Frequently Grown as a Companion to the Cuthbert

20 Cents
The Single Copy

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Cletrac
TANK-TYPE
TRACTOR

Hard this way,
but—

Easy on a track
The Cletrac Way

Cletrac is Built for Fast Orchard Work

Specifications

Horsepower: 12 at draw-
bar, 20 at belt pulley.
Length: 96 inches.
Width: 50 inches.
Height: 52 inches.
Weight: 3455 pounds.
Turning Circle: 12 feet.
Traction Surface: About
800 square inches.
Center to Center of
Tracks: 58 inches.
Belt Pulley: Diameter, 8
inches; face, 6 inches.

Cletrac is speedy in the orchard. Low set, with no projections, it weaves in and out among the trees without injury to them. Cletrac is powerful, compact and easy to handle. It swings short at the end of the row and turns into the next with less than a single turn of the wheel.

Cletrac's two broad, ground-gripping tracks carry this rugged tractor lightly over hilly, sandy or wet land without sinking in or slipping. Most of its ample power goes into drawbar pull and Cletrac plows sturdily on at its fast gait.

This tractor is right on the job for any kind of orchard or farm work the year through. Plow deep or shallow, medium gait or fast, Cletrac is perfectly obedient to the will of its driver. It pulls the spray rig smoothly along at just the right speed over the softest soil.

You can handle more acres with a Cletrac. This powerful tank-type tractor does as much work for you as six or eight horses could do—but in less time and at a lower cost. And if need be, its tireless motor will work right on through the night at emergency pumping or any other belt job you put it to.

"Selecting Your Tractor" gives full and interesting details of what Cletrac does to reduce the labor and cost of ranching.

Write for a copy and see the Cletrac dealer near you.

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for use on the farm.

Oronite Roof Paint

A high-quality protective
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ing and metal roofs.

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Gives a durable, smooth
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every pulling condition.
Keeps the axle cool; no
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The MICA makes it bet-
ter.

Eureka Harness Oil

Preserves the original
strength and life of leather
and keeps it soft and pli-
able. Keeps harness "new
looking."

Standard Hand Separator Oil

Correct Lubrication for
your Hand Separator, un-
der the conditions of high
speed and close fitting
parts.

ORONITE SHINGLE OIL *Preserves Shingles*

The roof takes the brunt of all weather—
rain, wind and hot sun. Keep your shingle
roof in good condition—a neglected roof
means the cost of a new roof soon.

Deterioration of shingles is caused by the
penetration of moisture and air into the fibre
of the shingles, hastening disintegration and
decay. The natural oils in the wood evapo-
rate and cracking and warping result. Your
shingles need constant protection against the
elements—rain, wind and sun.

Use Oronite Shingle Oil on all shingles
either on roofs or on side walls. It is a high-
quality preservative for shingles. It pene-
trates the shingle fibre and fills the pores
with a moisture-resisting preservative. It
retards evaporation of natural oils in the
wood and counteracts the effect of age and
exposure.

Oronite Shingle Oil is easy to use. It can be
mixed with colors. Ask our nearest agent
for formulas. Oronite Shingle Oil will make
your shingle roof last longer and give better
service to you.

STANDARD OIL COMPANY
(California)

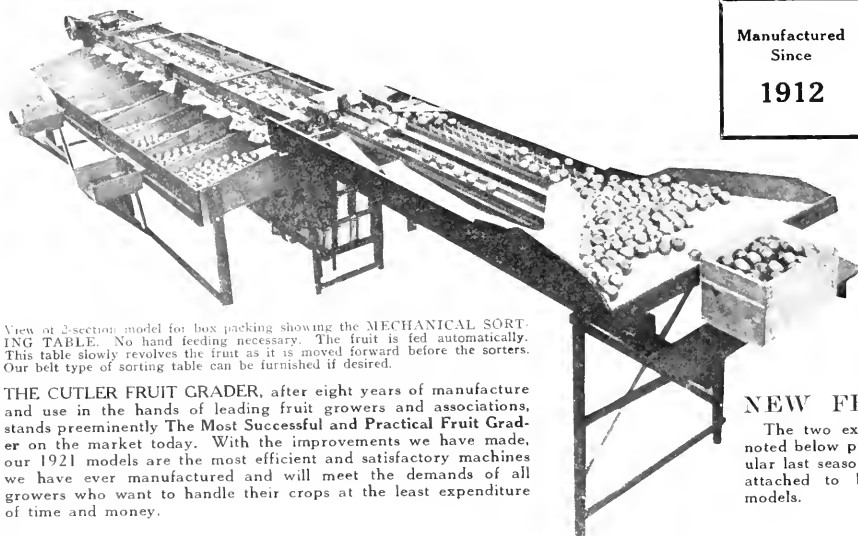
ORONITE *means* QUALITY

The Cutler Fruit Grader

For Box, Basket or Barrel Packing

Handling Apples, Pears, Peaches and Tomatoes

MADE IN MODELS SUITABLE FOR THE SMALL GROWER AND ALSO THE LARGER GROWERS AND ASSOCIATIONS



Manufactured
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Entered as second-class matter April 22, 1918, at the Postoffice at Portland, Oregon, under act
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PORTLAND, OREGON, MAY, 1921

NUMBER 11

The Canning Merger and the Northwest

By W. H. Paulhamus, President of the Puyallup and Sumner Fruit Growers Canning Company

IN REFERENCE to the advisability of organizing a big, strong well-financed canning company in the Northwest, it is a well established fact that the Pacific Northwest is capable of producing a greater volume of bush fruit per acre and of a better quality than any other section of the United States. It is also true that much raw material for manufactured products originates in the west. Is it advisable to ship our raw material to eastern manufacturers, permitting the East to create the payrolls necessary to manufacture from the raw materials to the finished product; or would it be more desirable for the residents of the Northwest portion of the United States to make a comprehensive survey of what raw materials they can produce to better advantage, quality and cost per pound considered, than can be produced elsewhere and endeavor to establish such industries on a permanent basis and of the highest grade?

New England has been exceedingly successful in organizing big, strong financial institutions for the purpose of conducting the manufacturing industry. In fact, the city of Boston alone has made it possible to organize hundreds of manufacturing institutions with an abundance of capital so that these companies could scour all sections of the United States picking up raw material and shipping it to New England to be manufactured into finished products. This has resulted in a wonderful dinner pail brigade in the New England states.

IT IS not my desire to criticize the Boston country for so doing, but on the other hand, to point out to our own people that this should be an object lesson for us to the extent that we should try to separate the wheat from the chaff and organize companies of our own so that we can not only produce the raw material, but manufacture it into a finished product, with the result that we will not only find employment

for the people who are now here, but many in addition. This is what builds up communities.

It is a well established fact that we have capital with which to manufacture, very largely because we have been purchasing stock in manufacturing or spec-



W. H. PAULHAMUS

President of the Puyallup & Sumner Fruit Growers' Canning Company, who believes that the Oregon-Washington canning merger should result in great benefit to the fruit industry in the Northwest.

ulative concerns that have not meant very much to the up-building of our particular community.

While in Boston seven years ago, my attention was called to a very fine team of horses hauling a very heavy load of wool on one of the principal streets. Upon inquiry I was told that no sheep were raised in that portion of the country, but that the wool was shipped in from either Washington or Oregon. This suggested to my mind the advisability of manufacturing our wool at home; and instead of shipping the raw material to the manufacturing centers of New England, it would be very much better for us if we were able to furnish employment to labor in our own com-

munity and ship the finished product. In fact, my mission to Boston was to sell berries in barrels to the jam manufacturers in that city, but the object lesson presented to me by the wool incident suggested that it was a good policy for the wool grower to have his product manufactured into finished commodities at home, and that it was also a good policy for the berry grower to do the same thing.

On going up to Portland, I found thousands of tons of small white beans were being shipped from the Pacific Coast country to Boston for the purpose of being manufactured into Boston baked pork and beans, and that a very large percentage of the codfish which has created so much aristocracy in Boston was shipped from the state of Washington.

AFTER viewing this condition I resolved to endeavor to help manufacture the bush berries of the Northwest into the finished product instead of sending the raw material to Boston, as we had formerly done.

During the year of 1920, with a liquid capital of about \$300,000.00, the Puyallup & Sumner Fruit Growers' Canning Company did a business of more than five million dollars for the reason that the banks were willing to advance all the money necessary to manufacture the raw material into the finished product providing the finished product was sold under good and sufficient contracts prior to being manufactured.

Under such conditions our local organization did not require very much capital, but now that the consumer is on a strike and does not desire to purchase anything unless it can be secured at less than the cost of production, it is necessary for all manufacturing plants to have sufficient capital in the business to operate in an orderly way.

It has always been my vision that unless the grower made a fairly good profit out of what he produces, he would not be much of an asset. In other words,

any business enterprise that is not profitable will soon perish. With this idea in view, if we can organize a big, strong canning and preserving company and have a management with a heart, we can not only stimulate the industry and develop it in an orderly way, but we can at the same time refrain from trying to purchase from the producer below the cost of production, and at the same time keep orderly control of the industry so that the jobber and retailer will not exact too much spread between the producer and the consumer.

With the right kind of business men in control of an enterprise of this kind, it should become a wonderful asset for the Pacific Northwest, and I am hopeful that the canning company that we have in mind may prove to be that kind of an organization.

Merger Started

TRANSFER of properties to the recently incorporated Oregon-Washington Canning & Preserving Company has already started, the first unit to be taken over by the gigantic \$10,000,000 merger of the berry and fruit canning industry of Oregon and Washington being the properties of the Puyallup & Sumner Fruit Growers' Canning Company. These consists of plants at Puyallup and Sumner, Wash., and Albany, Ore., with stores and warehouses at Puyallup, Sumner and Orting and seventeen receiving stations in various parts of the two states. The properties were taken in at an appraised valuation of \$1,030,000.

This is only the first step in the big merger, the officers of which are now investigating various other properties with a view of taking them in as soon as possible that work may be done at once toward merging all interests in time for the opening of the berry season.

The Puyallup & Sumner concern last year did a cash business of more than \$5,500,000, its trade lines extending to every state in the union. In addition to the canneries and other buildings, there is now being completed at Puyallup a \$325,000 concrete, steel and glass jam plant which will have a total capacity of 270,000 pounds daily.

Announcement of the acquisition of the first unit was made by the organization committee of the new corporation. It was signed by H. C. Henry, president of the Henry Investment Company; Reginald H. Parsons, president of the Seattle National Bank; and Gordon C. Corbaley of the Meinrath-Corbaley corporation, all of Seattle; Chester H. Thorne, chairman of the board of the National Bank of Tacoma; W. R. Rust of the Smelter Securities Com-

pany, Tacoma; Henry Rhodes, president of Rhodes Company, Tacoma, and W. H. Paulhamus, president of the Puyallup & Sumner Fruit Growers' Canning Company.

The new corporation, which proposes putting the fruit and berry canning industry on a stable basis, backed by sound financial and business leadership,

was organized at a series of meetings at Seattle and Portland last month. The organization committee includes bankers, financiers and businessmen prominent in affairs of Seattle, Tacoma and Portland. The board of directors in its permanent form, will consist of sixteen men, with eight from Washington and eight from Oregon.

Methods of Training Bush Fruits

By J. L. Stahl, Horticulturist, Western Washington Experiment Station

STRAWBERRIES need no training except to control runners. If the hill system is used all of the runners except just around the hill will be kept off. Where the narrow matted row system is followed a strip of 15 or 18 inches the length of the row will be allowed to fill with runner plants and a strip the same

greens are allowed to overlap 3 or 4 feet on the trellis, but beyond that they are usually cut back.

RASPBERRIES

RASPBERRY canes are usually supported and held in place by a trellis of two or more lines of number 12 or 14 wire. Sometimes the wires are strung on cross pieces of 1 by 4 or 2 by 4 lumber nailed to upright posts but often they are fastened with staples to the sides of the posts. Seven-foot posts are commonly used set two feet in the ground and 30 to 35 feet apart. It is important to have the posts set firmly in the ground. The hole should be large enough to receive the post and allow room for tamping soil on each side. Tamping should begin after the first shovelful of soil is placed in the hole and it should be continued until the hole is filled and the post firmly set.

WEAVING SYSTEM

BY the weaving system the fruiting canes are bent over and woven to the trellis either on one or both sides. The wire for these canes are strung at about 54 inches from the ground. Wires are also placed at a height of 24 or 30 inches to help hold the young



Raspberry Field in the Puyallup, Wash., District.

width between rows will be frequently cultivated and kept free from runners.

Raspberries, Blackberries and Loganberries are usually trained on a trellis by the beginning of the second season of growth. The last of February or early March is a good time for training. There are several methods or systems of trellising, but only a few of the more common ones will be described in this article.

The number of fruiting canes to allow in each hill will depend on the type of berry, individual plant, and system of training. In general, the number for raspberries is 5 to 8, loganberries 10 to 14 and evergreen blackberries 8 to 12. The weakest canes are removed entirely. Most growers cut back the lateral growth on the fruiting canes of evergreens either entirely or to a short stub. This is not so important with loganberries as the lateral growth is shorter. Lateral growth of raspberries is removed entirely. The tips of the canes of adjoining plants of logans and ever-



Glimpse of an Oregon Loganberry Patch.

canes in place during the early growing season.

Where weaving is done on one wire the other upper wire serves to hold the

(Continued on page 16)

The National Marketing Conference

By Arthur M. Geary, Delegate from Oregon

AT the national convention of fruit growers, held at the Congress hotel, Chicago, early in April under the auspices of the American Farm Bureau Federation, marketing was the principal topic under consideration. The idea of the convention originated with the American Pomological Society, whose members during the last seventy-three years have led in the study and development of the science of horticulture. The fact that the American Pomological Society stepped from its beaten path and initiated such a movement is in itself indicative of the vital importance of the marketing problem.

As a part of the marketing problem, the best methods of obtaining increased consumption of apples and other fruits was discussed. The American Farm Bureau Federation, with its present membership of two million farmers, of whom a large proportion live in the middle west and southwest, in itself offers an outlet for Pacific Coast-grown fruit. The figures available show in a startling way that large sections of the farm population of this country are not receiving the supplies of fruit that they should have and that they would gladly avail themselves of.

The convention recommended to the American Farm Bureau Federation that a horticultural department be established with a paid secretary who would take an active part in aiding in the development of new outlets for fruit among the farmers and their organizations.

The inter-relation of the interests of fruit-growing districts was shown. Improperly graded apples on the New York or any market reacts against the demand for all apples. If an apple is marketed after it has passed its prime, the consumer of it is not a booster of the consumption of other apples.

There has been the committee of seventeen for the wheat growing industry, and there is the committee of fifteen now at work for the livestock growing industry and as a result of the recommendations of this national convention, President J. R. Howard of the American Farm Bureau Federation is to appoint a committee of twenty-one for the study and formulation of a plan of marketing for the fruit growing industry. Under the plan suggested for the division of representatives of this committee, two will be appointed from Washington, two from California, one

from Idaho and one from Oregon.

It should be presumptions in any one to predict what such a committee will develop after intensive study. The success of any plan formulated will depend upon its merit as the fruit growers of all districts will have the opportunity of accepting or rejecting.

If the plan has merit, the backing of the American Farm Bureau Federation should insure its success. The American Farm Bureau Federation has the singleness of purpose and the punch to put over a plan for the fruit growers just as it has already done for the wheat growers.

THE co-operative plan of marketing fruit has never had a fair chance in the Pacific Northwest. However, in California there is the California Fruit Growers' Exchange and the California Fruit Exchange, and in Florida there is the Florida Citrus Exchange which have national systems of distribution through agents, the hiring and firing of whom rests solely with board of directors composed of fruit growers.

The fruit growers of the Northwest have been quite successful here and there in co-operating in local units, but what opportunity has a local association to obtain proper distribution for the fruit of its members. Listen to the wail of the sales manager of one of the well established co-operative associations who for reasons of his own does not desire his name to be known:

"In passing I would say that the handling of our fruit products through brokerage concerns in the various markets is a very unsatisfactory method of selling. The broker, as you know, is supposed to represent the shipper, but in actual practice he is in such a position as between the shipper and the trade which he serves, that his interest lies rather with the trade than with the shipper. Most of the brokers handle various kinds, such as deciduous and citrus fruits as well as potatoes and other vegetables, and in many cases brokers handle a line of groceries and general merchandise as well. A good broker has so many accounts of the same class of fruit that he does not feel himself tied to any one shipper. In other words, the broker's business is so tied up to the good will of the trade that he very often cannot give the shipper strong support and fight his deals through as they should be handled if the shipper is to receive a square deal.

Especially in a year like the one which we are just concluding, the broker is inclined to favor the jobbers with whom he does business."

So much for the position of the local co-operative association that endeavors to market independently. It is true that brands that have become as well known as the Hood River Apple Growers' Association and Big "Y" as well as others are in demand and the organizations shipping under these brands have patrons that wire in to the local office for their supplies. But when there is a big crop, is the demand from casual buyers sufficient to dispose of the output of any of these local co-operative organizations at remunerative prices?

Now what can be said for the co-operative association of growers that ties up with one of the private national marketing systems? From the standpoint of the eastern speculators that have organized and control these marketing systems the plan is entirely satisfactory. It may be suggested that certain of these marketing systems will not speculate. Names of corporations mean very little, while the names of men who own and control these corporations mean everything.

It is not only of interest to the grower to know whether or not the brokers and agents that have been hired to market his fruit are also selling fruit in which they have speculated, but also it is important to the grower to know to whom his fruit is being sold. Mr. Armstrong, president of the Washington Farm Bureau Federation, has formulated plans whereby a permanent record can be kept of all fruit marketing transactions in the different markets. This is no more than is being done in various livestock markets at this time.

The charges and profits that do not appear upon the growers' statements constitute a big factor in the spread between the price the consumer pays and the price the grower gets. The forming of corporations bearing picturesque and impressive names has become a habit with the fruit speculators. One can but gasp at the effrontery of the representations of some of these speculators and combinations of speculators and then gasp again with surprise at the manner in which groups of growers swallow their hook, bait and tackle. As a matter of fact the speculators have been able to turn to their advantage the unwillingness of growers of different

(Continued on page 17)

Conveyors and the Fruit Industry

By James C. Hunter, Conveyor Engineer D. E. Fryer & Company, Seattle, Washington

TO EXPEDITE the handling of fruit crops and other perishable commodities is one of the urgent needs of the day. Economies is the foundation stone on which the science of business is built. It underlies all business, just as mathematics underlies all branches of engineering and its general principles should be thoroughly understood when working out the problems confronting the equipment engineer of any

expensive method of transportation is still in use in very many places.

Gravity rolling belts and inclined conveyors, spiral chutes and straight lift elevators are well known equipment used in the handling of the large apple crops in the United States. The standard gravity conveyor systems have proved to be particularly well suited to the requirements of apple and fruit packers, and are now doing double time service in many apple and fruit packing warehouses in all parts of the country. In addition to the speeding up of the output, and at the same time reducing labor to the minimum, these conveyors perform all the hard work of transporting the products.

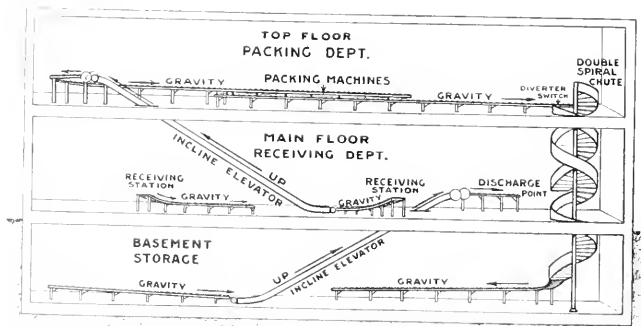


Unloading Apples Direct to Conveyor.

industry. The conditions in the handling of fruit are so exacting that mechanical equipment should be installed where it can save time and labor and avoid the large claims for damages arising from the rough man-handling of the fruit packer.

A rapid turnover of the fruit pack is a paramount demand, and when this is accomplished you are giving the orchardist, shipper and consignee service, and you are also reducing your excessive costs to a minimum. In the fruit packing industry, mechanical sorting machines have most entirely replaced the old hand method, but the old slow and

handle open baskets or boxes of any kind of fruit. This illustration shows by the arrow marks a box arriving at the packing plant and being placed on receiving lines of portable sections of gravity conveyors to inclined elevator and from there being rapidly transported to the packing room. After the packing process is completed, the filled cases are allowed to proceed on gravity conveyors leading to a spiral chute or a reverse operating inclined elevator, and by this means taken to one of the lower floors from which they are transported by gravity lines or horizontal belt conveyors directly to the piling space or to



Lay out of a Standard Conveying System as Applied to Apple Packing and Warehouse Requirements.

ears for shipment.

Experience has shown that where fruit is received on a line of gravity and conveyed to the point allotted, one receiving door will do the work of some four or five doors where the boxes are merely placed in the opening and trucked in. The use of gravity roller conveyors does away with unnecessary delay in receiving fruit, and allows the orchardist to make more trips daily to the warehouse, which naturally pleases him, because there is nothing more annoying than to have to wait in line for hours before being able to discharge

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fruit at the warehouse. This is especially so when warm days are causing the fruit to ripen quickly, or when the crop is likely to be caught by frost at night if it is not promptly received at the storage house and protected.

Recently I made a tour of one of the principal apple districts in the state of Washington and found to my amazement that in one large plant while the packing room was wonderfully well equipped, the old method of using four wheeled trucks was employed in receiving and shipping out of the basement—which was itself below grade level—in conjunction with a small elevator. Manifestly this was a slow and costly operation entirely too much dependent upon the human element.

While installing conveyor systems, the management should bear in mind that standardized equipment should be used which has been so designed, and which should be so placed that additional units may be added from time to time so as to make an enlarged but a perfectly operating system.

According to a recent report of the United States Bureau of Crop Estimates, the commercial acreage of strawberries in the United States for 1921 will show a considerable increase over that of the preceding year. It is estimated that the acreage in strawberries this year will be 57,219 acres as compared to 48,619 acres in 1920, giving an increase of 8,600 acres.

Orchard cultivation should start with a rush now. Clear, sunny days causes the ground to dry rapidly. It often pays to hire extra teams or a tractor in order to plow just at the right time so subsequent cultivation will be cheaper. —O. A. C. Experiment Station.

The Wenatchee Fruit District

By E. H. McPherson

THE Wenatchee fruit district, which includes all of the fruit growing areas in Chelan, Douglas, Okanogan, and Grant counties, has the best prospects for the 1921 apple crop ever known in its history. Preliminary estimates made by District Horticultural Inspector P. S. Darlington, indicated a total yield of between 15,000 and 16,000 carloads of 750 boxes each, or between 11,000,000 and 12,000,000 boxes. A record breaking crop of summer fruit is also predicted, including cherries,

apricots, peaches, pears, prunes and plums, of which the estimated yield for the present year is 2,000 carloads.

This compares with the total apple yield of 9,500 cars in 1920, and 10,034 cars of summer fruit. It is also probable that there will be more planting of new orchards in the Wenatchee district during 1921, than for any season during the past five years. Nursery men estimate that 2,000 acres of fruit trees will be put out this year, most of which will be apricots, peaches, cherries and

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pears. In the western Okanogan irrigation district, extending from above Oroville to Tonasket, about 500 acres of summer fruit will be set out this year. This new planting is being done under contract with the Puyallup & Summer Fruit Growers' Canning Company of Puyallup. This company will establish a shipping station at Oroville and Tonasket from where the fruit will be sent to the main cannery at Puyallup. Strawberries, tomatoes, and other small fruits and vegetables will be planted between the rows of trees for the first few years.

The total area of orchards in the Wenatchee district is 35,000 acres, most of which is now in bearing, and divided among the counties as follows: Chelan county, 17,360 acres; Okanogan county, 8,480 acres; Douglas county, 6,350 acres; Grant county, 3,500 acres. Over 30,000 acres of this is in apples, which is the staple fruit crop of this district. This comparatively small area produced over 12 per cent of the entire commercial apple crop of the United States in 1919, and about 10 per cent of the entire commercial apple crop in the country in 1920. About one-third of the total amount of boxed apples grown in the United States are produced and shipped out of the Wenatchee district annually.

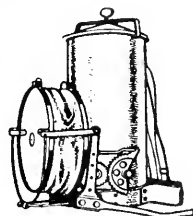
The total money value of the 1919 fruit crop in the district was \$22,500,000, or an average yield of about \$700 per acre, which is said to be the largest financial income per acre from any similar area of land in the entire world. The 1920 fruit crop returned to the growers less than \$15,000,000, owing to the decreased volume and lower prices received.

For the 1921 fruit crop, 60,000,000 feet of lumber will be required to make boxes. This is equal to the total timber yield of twenty sections of eastern

Washington pine land, or six sections of the heaviest western Washington or Oregon forests. About one-half of the boxes used in the district are made by local mills, while the rest are shipped in from Spokane, Seattle, Bellingham, Tacoma and even Portland.

Practically all of the land suitable for growing fruit, and capable of being irrigated has been taken up and put into orchards, in the Wenatchee district. Nearly all of the orchards are located in the valleys of the Columbia, Wenatchee, Entiat, Methow and Okanogan rivers, also along the shores of Lake Chelan. As a result of the unusual prosperity enjoyed by the fruit grow-

ers in this district during the past three or four years, the orchards are generally equipped with modern packing and storage houses, and the fruit growers live in fine modern homes and drive the best makes of automobiles. Their orchard work is done by the aid of tractors, and power sprayers, while trucks are used to do their heavy hauling. Horses are almost unknown throughout the more settled orchard areas. Good roads connect the orchards with the towns and shipping points, and also reach the many beautiful hunting, fishing and camping resources, which are easily accessible from every part of the district.



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Currant Grape Growing

THE heavy importation of currants into this country and the profitable price received for them has caused considerable investigation on the part of horticulturists with the view of ascertaining the possibilities of producing the currant grape in the United States.

The viticultural investigations of the United States Department of Agriculture, therefore, have demonstrated that the choicest varieties of these currant grapes, which formerly it was believed could not be made to bear sufficiently, can be made to produce regular and good crops, and the specialists in the department state that this paves the way for the establishment of another very important and extensive grape industry in this country.

An exceedingly important feature in connection with this new fruit industry is that currant grapes are among the very earliest to ripen. In fact they ripen so early that they can be dried and put away before the earliest rains occur in districts where other raisin varieties are too late in ripening. In the present raisin producing sections of the country currants can be grown as an advance crop and cured and stored by the time other raisin grapes ripen, so that the same labor employed in harvesting and curing currant grapes can harvest and cure the other raisins after having accomplished that work.

Experiments made by the United States Department of Agriculture at the Fresno experiment vineyard indicate that when vines of the currant grape are planted at distances the equivalent of 8 by 8 feet apart, an acre of good vineyard in this country will yield from 6 to 15 tons (an average of 10½ tons) of grapes, or, conservatively, from 2 to 5 tons of cured currants. From this it is estimated that 3,400 to 8,500 acres would be necessary to produce the 34,000,000 pounds of currants which are annually imported into this country.

The Value of Tillage

THE importance of tillage cannot be too strongly emphasized. Many years ago a student of plant pathology coined the phrase "tillage is manure". This idea of the benefits of tillage still holds good and in fact intensive cultivation of all root crops is practiced to a greater degree today than ever before. Before plant food can be taken up by the tender roots it must be dissolved in water, the solution then being taken up by the roots. The finer the soil is pulverized the greater is the surface exposed to soil water, resulting in more plant food being dissolved and made available for the plant roots.



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Send coupon for "Save the Surface," a free book which tells of the importance of good paint, and the need for painting now if your paint is wearing off.

Also ask for small booklet of Fuller's Farm Paints and Varnishes.

Ask our Specification Department any question that you'd like to have answered about painting—complete detailed advice is given free.

W. P. Fuller & Co.
Dept. F-15, San Francisco.

Please send me, without charge, a copy of "Save the Surface" and your small booklet of farm paints and varnishes.

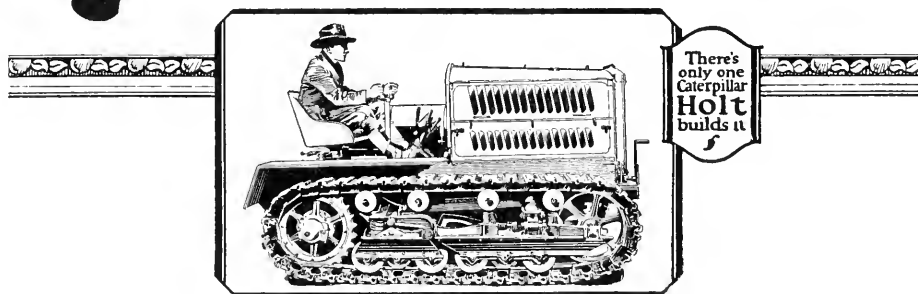
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Low Cost Power for Orchards



Here's the tractive power needed for orchard work—in compact, flexible form—and at a minimum cost. The "Caterpillar" 5-ton Orchard Tractor shares the record of larger "Caterpillar" Tractors for lowest cost per operating hour—for economical use of fuel and oil.

The "Caterpillar" 5-ton Orchard Tractor is narrow and low-down. It gets between, under and around trees in a closely planted orchard without hitting limbs or fruit. It is short turning, easy handling and has three speeds, $1\frac{1}{2}$, 3, and $5\frac{3}{4}$ miles per hour. It has plenty of power for plowing and sub-soiling deeply.

Besides all of these special features the fact that it's a "Caterpillar" Tractor is assurance of long life, low upkeep and operating costs and dependable, trouble-free performance.

Get full information about the "Caterpillar" 5-ton Orchard Tractor now—see the Holt representative in your neighborhood or write us.



The Holt Motor

—sold separately

Built for the severe requirements of tractor service it is especially adapted to economical operation of pumping plants and other farm work. It is a perfected motor of the valve-in-head type in 30, 45, 55, and 75 horse-power ratings. Holt accuracy and dependability guarantee its service.

The Holt Manufacturing Company

Stockton, California

Peoria, Illinois

Spokane, Washington

San Francisco, Calif.

Los Angeles, Calif.

Larger Sized Apples

THE NEED for larger sized apples, as voiced during the past season by some of the largest handlers of Northwestern box apples again calls attention to the importance of thinning. In addition to this while the production of fancy apples is dependent upon many other factors such as spraying, pruning, irrigating, etc., thinning is one of the most important practices in securing for the grower the highest market returns.

As competition in the apple industry of the country has become more keen the necessity of thinning to produce the highest grade of fancy box apple has become more apparent, although many apple growers have not yet realized the importance of practicing thinning in a systematic way. A well known authority on apple culture says:

"It no longer pays to grow ordinary fruit. There are but few localities in the United States in which medium to good sized apples cannot be raised. Therefore, ordinary fruit or the choice grade must compete with the home-grown product wherever it is shipped. On the other hand, localities in which strictly fancy apples can be raised are much less numerous and such grades compete less frequently with the home grown product. The larger the apple within certain limits, that is the larger the edible portion, the more highly it is valued. According to market standards, by increasing the diameter of the apple one-half inch, we increase its market value many times. By the removal of part of the crop at an early stage in its development, this increase in size can be obtained and it is usually impossible to obtain it otherwise.

"Although the increase in the current year's crop is ample reason for thinning, it is not the only benefit to be derived. By reducing the tree's crop this year, there is more likelihood of a good crop the following year. Much of the so-called habit of "alternate bearing" in apple trees is directly traceable to the fact that they overbear one year and recover from this overtax by bearing a very light crop the following year. Many broken limbs in the orchard can be averted by proper thinning and much time and money saved in propping the orchard.

"Methods to be used in the thinning operation will vary somewhat with the conditions, such as soil, age of trees, varieties and methods of irrigation and pruning. The fruitgrower should experiment and learn the best methods to use under his conditions. Some orchard-

ists thin to a definite number of boxes on a certain aged tree. This is determined by counting the apples on one or two trees. These counted trees are used as models and the rest of the orchard thinned accordingly. Other growers adopt the plan of thinning the fruit according to distance. The latter plan is much easier of adoption and produces the desired result where the work is carefully done.

"For the best results thinning should commence immediately after the June

drop, the work being done while the apples are about an inch in diameter. By removing the fruit from trees that are overcrowded at this time the remaining apples receive the entire strength and nourishment of the tree and reach a much finer degree of maturity. The cost of the work under average conditions is only slight compared with the increased returns, in addition to the fact that much time will be saved at harvest time in sorting the crop."



Big Stumps—or Little!

Get them *all* out with



STUMPING POWDERS

Du Pont and Repauno Brands

(Pacific Northwest Products)

SIZE makes no difference—they all yield to Du Pont or Repauno, now recognized as the farmer's best friends for land clearing.

Dynamite is the modern method. Most farmers use Du Pont or Repauno Stumping Powders because they are efficient, reliable, low-freezing and remarkably economical.

It costs money to clear land by hand labor—too much money, when dynamite is available to all to do the work at a fraction of the time and expense.

Right here in your own county many farmers are clearing their stump lands economically and efficiently with Du Pont or Repauno Stumping Powders.—Pacific Northwest Products.

Your dealer will supply you with Du Pont Explosives and Blasting Accessories.

Our free book, "Development of Logged-off Lands," shows you ways to clear land, dig ditches and plant trees with dynamite. Write for a copy.

E. I. du Pont de Nemours & Co., Inc.

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Some Reliable Northwest Nurserymen

Unique Home Collection

Alwild Strawberry	FREE
Productive Better Canner	
15 Plants	\$.25
Sugar Strawberry	.45
15 Plants	
Peerless Everbearing	.75
15 Plants	
"New Race" Strawberry	.90
15 Plants	
Duluth Everbearing	1.75
15 Plants	
Lucky + Everbearing	5.00
15 Plants	
Unique and one other	\$9.10
ALL PREPAID	

Evergreen Plantation

NEW MEADOWS, IDAHO

OUR TREES

Carefully Grown
Carefully Selected
Carefully Packed

Will give satisfaction to the planter

Salem Nursery Company

428 Oregon Building
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Additional Salesmen Wanted

Oregon Nursery Company

ORENCO, OREGON

Since 1867 Growers of

DEPENDABLE TREES

Fruit and Ornamental
Trees, Shrubbery,
Berries, Roses,
etc.

Large Illustrated Catalog
sent on request.

Yakima and Columbia River Nursery Co.

Growers of Choice

FRUIT TREES
SMALL FRUITS and
ORNAMENTALS

Yakima, Washington

*"Yakima Grown" is
the best guarantee.*

This is to announce that I have resigned my position as President and Salesmanager of a Nursery Company, which position I have filled for over sixteen years, and I am now doing business under the firm name of

E. A. Bennett Nursery Company

with a full line of fruit, nut, and ornamental trees and shrubbery.

I am now soliciting the patronage of the public. Assuring square dealing, first class stock at correct prices I am in need of a salesman in every nook and corner of the Northwest.

E. A. BENNETT

1030 Chemeketa Street
Salem, Oregon

Capital City Nursery Company

SALEM OREGON

*Will supply you with
first class stock in*

**FRUIT, NUT AND ORNAMENTAL TREES,
SMALL FRUITS,
ROSES**

Send for catalog

BETTER FRUIT'S BIG FAMILY OFFER!

**OFFER
A**

BETTER FRUIT for one year } ALL FOUR for only
Western Farmer, for one year } **\$2.70**
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You Get All Five Publications by Returning This Coupon and \$2.70

This offer expires in 30 days. Order now and make this big saving

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Gentlemen: I am returning this Coupon with \$..... for which I am to receive
Offer..... as listed herein.

My Name is Town

Street or R. F. D. State

Fruit For the Garden

FOR home use red raspberries produce the best results when grown in hills and tied to stakes. Cultivated in this way they are easily kept within bounds and the grass and weeds are kept under control. The best way is to set three plants in a hill four or five feet apart. The object of setting three plants instead of one is to secure a good growth of canes and a crop of fruit the second year.

Stakes one and one-half to two inches in diameter and five to six feet apart are set in the center of each hill early in the spring and the canes are tied to these with a heavy cord near the top. The ends of the canes may be shortened a little or cut off just above the stake. To produce plenty of fruit for home use five or six canes are enough for each hill.

Our Bulletin Service

CO-OPERATION of banks of the Pacific Northwest in assisting growers of this section to recoup losses of last year by taking advantage of frost damage in the eastern states is urged in a current Better Fruit Bulletin issued by this magazine and sent to every banker in the Northwest. It pointed out that a bumper crop was expected in this region because of ideal weather conditions and last year's short crop while the heavy eastern crops of fruit last year combined with frost damage this season meant an undoubted shortage there.

Harvesting costs being materially lower than last year should mean good, profitable prices for fruit on the Atlantic seaboard and abroad, asserted the bulletin, which called attention to the vital necessity of keeping up the necessary activities which alone can make certain a clean marketable crop. Letting down the bars means disaster, contended the bulletin, which held that the bankers' assistance in restoring confidence of fruit growers who have lost heart is invaluable at this time.

The Better Fruit Bulletin Service is part of the magazine's policy to back up the fruit industry of the Pacific Northwest.

Good Stationery Dignifies Your Business!

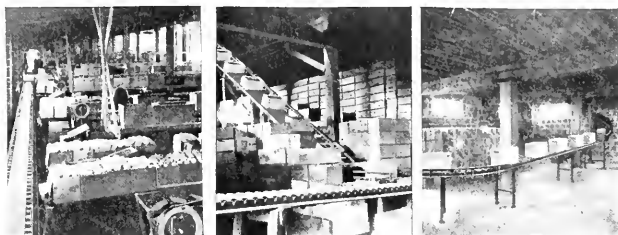
THE business farmer or fruit grower needs high-class stationery and envelopes. We create the kind of stationery which is a credit to the business which it represents. We are also the builders of effective advertising literature of all forms—booklets, folders, mailing cards or anything else you need to help you sell your product.

Write us for full information.



**The Arcady
Company**

12th and JEFFERSON STREETS
PORTLAND, OREGON



Let Gravity Move Your Fruit!

A Standard Combination System for the indoor transportation of your fruit in the course of receiving, packing, boxing and shipping.

Wherever—Whatever your handling problems are, there is a Standard Service within immediate reach.

Get in communication with our nearest sales office and have them become your conveying-efficiency assistant in planning with you a **Standard System** to meet your specific needs.

Standard Conveyor Company

Formerly Minnesota Manufacturers' Association
NORTH ST. PAUL, MINNESOTA

Write for catalog for the fruit-packer

WESTERN SALES OFFICES

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Los Angeles, Cal. 617 I. N. Van Nuys Bldg.	Seattle, Wash. Lumber Exchange Bldg.
Portland, Oregon. 701 Gasco Bldg.	Spokane, Wash. Paulson Bldg.
Salt Lake City, Utah. Dooly Bldg.	Tacoma, Wash. 501-2 Provident Bldg.
San Diego, Cal. 6th and Market	Butte, Mont. 431 Rialto Bldg.

MYERS HAY TOOLS

**UNLOADERS-
FORKS-SLINGS-
PULLEYS-TRACKS
AND
FIXTURES**

Frequently the weather is unsettled during harvest. Usually help is scarce and costs a lot. Too often, crops are damaged in the field before they reach the barn. This condition exists every year. Why not anticipate it, and save time, labor and money, during this and future harvests by unloading your hay, grain, fodder and other crops with MYERS HAY TOOLS whose large capacity, ease of operation and fast service insure maximum unloading economy while their sturdy construction guarantees dependable long time service.

MYERS HAY TOOLS—OK, SURE GRIP and CROSS DRAFT UNLOADERS, FORKS, SLINGS, PULLEYS, TRACKS and FIXTURES, like the other MYERS "Horn-Bait" PRODUCTS such as Myers Pumps for Every Purpose, Season and Tubular Locomotives and Tractors, cost no more than many of the less reliable kinds and there is no question no worry about the unloading work when harvest operations are in full swing. And also mention that MYERS HAY TOOLS through their ability to do your unloading better than most others, soon pay for themselves in the saving of time and labor they effect.

Good dealers everywhere will MYERS HAY TOOLS and other MYERS PRODUCTS. If your dealer cannot at once supply you with the MYERS write us. Send TODAY for free booklet.

F.E. MYERS & BRO. NO 135 ORANGE ST.
ASHLAND OHIO.
ASHLAND PUMP AND HAY TOOL WORKS

Pacific Northwest
Distributors



Portland, Oregon
Spokane, Wash.

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BETTER FRUIT

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by

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Advertising Rates on Application.

Financing the Grower

THERE is one point that will greatly help in making the coming season in the Northwest fruit industry successful and that is for bankers and other financial agencies to lend their utmost assistance to the grower. As in many other lines of business at the present time the fruitgrower needs financial assistance and it is only by receiving it that he can produce the maximum results in the way of producing the greatest volume of high-grade fruit. It is necessary that he be enabled to continue to practice the best methods in crop production, despite the fact that uncertainty and unrest are reported to be causing the grower to take a somewhat pessimistic view of the situation.

With reports of greatly reduced crops owing to frost damage, in most of the fruit growing sections of the country, with the exception of the Pacific Northwest, the outlook for a profitable season in the latter region appears to be exceedingly good. Financial assistance, therefore in helping the grower to take advantage of producing and placing on the market one of the largest and best crops ever shipped out of the Northwest should not be lacking.

The close co-operation of the financial institutions of the Northwest in this respect will inspire a confidence that the fruit growing industry greatly needs

and should result in a short time in stimulating every effort toward a general betterment of conditions.

Shipping by Water

ALTHOUGH recent statements made by authorities in the railroad world to the effect that freight rates should come down as greater economy in the operation of the roads develop are encouraging to the fruitgrower who must ship his product across the continent to find a market, the success in shipping fruit by water through the Panama Canal is much more encouraging. It is more encouraging because this mode of transportation at a reduced rate can be taken advantage of in the near, rather than in the remote future, for fruit shipments to the Atlantic seaboard and for export.

And this is what the Pacific Northwest fruitgrower needs, and needs now—a relief from transcontinental freight rates that are so high that Eastern apple growers during the past season were able to sell a barrel of apples at a profit for what it cost the Northwest grower to produce and ship. While it is quite probable that the two steamship lines that have announced that they will handle large shipments of apples through the canal this year will do so largely for export, still the establishment of these water routes from the Pacific Northwest is the opening wedge that must lead to coast to coast shipments. At any rate the handling of a large volume of the export box apple trade from the Northwest at a reduced rate by steamship lines will be a big factor in making it possible for many growers to sell their product on a margin of profit.

These all water routes, therefore, should be supported by being given all the tonnage that they can handle in order that the service may become as extended as possible.

Our Advertising

WE BELIEVE that the advertising in *Better Fruit* should be just as interesting to our readers as the articles and news matter. Modern advertising is educative. It is written nowadays to keep the reading public posted on the

latest and most efficient ways of doing business or of engaging in some special industry, as well as to bring to the attention of the reader the particular article which the advertiser has to offer the public.

In fact, the advertisement of today is a story—a sales story devoid of the extravagant and unreliable statements which so often characterized the merchant's or manufacturer's appeal for business through the printed page in the past. In its place we have as a rule a plain statement or sales argument from the advertiser in presenting his wares to the public. Along with this is the fact that local and national associations of advertisers are just as anxious to see that nothing but advertising that bears the stamp of genuineness is placed before the public and they act as a safeguard against unscrupulous advertisers.

The advertising in *Better Fruit* embodies the best and most reliable that can be presented to its readers and we are satisfied that they will find its personal both interesting and profitable.

The Outlook

THE INCREASE in freight rates. High production costs, a general curtailment in buying and the deflation program all had their influence in making the past season for deciduous fruits in the Northwest from being as profitable as preceding seasons.

Indications now are that the coming season should be much more favorable. So far weather conditions have been admirable in the Pacific Northwest for a good crop of all fruits, while producing costs along most lines show a tendency to come down. The outlook for improved business conditions in the near future are promising as well as the probability of a widening of the export trade for all American fruits.

Co-operative and other agencies for handling the Northwest fruit crop are getting in line on a much more settled basis than seemed possible a few weeks ago, so that expectations now lead to the belief that the coming year should show a successful outcome for the fruit industry generally.

Bits About Fruitmen and Fruit Growing

THE REPORT that a new company is being organized to operate the eight large Rupert canneries in Oregon and Washington is welcome news to the fruitgrowers of the Northwest, who have found these institutions to provide an excellent market for their canner products. The reorganization of the company is taking place under the direction of H. F. Davidson who was recently elected president of the Rupert company, and a committee of bankers and businessmen, with the assistance of the creditors who express themselves as anxious to see the Rupert company again put on its feet. The canneries which will be turned over to the new company are located at Newberg, McMinnville, Falls City, Roseburg, Lebanon and Springbrook, Oregon, and at North Puyallup, Wash. The valuation placed on these plants exceeds \$400,000 and they have a capacity of 750,000 cases of fruit and vegetables annually.

▲ ▲ ▲

LATE investigation of the extent of the damage caused by the freeze in the early part of April to fruit in the middle west and east is to the effect that the loss runs into many millions. The loss was made much worse by the fact that tree fruits in all sections of the country were much further advanced than they have been in many years. Even the south did not escape, as the loss in the Cumberland-Potomac-Stenandoah fruit belt is variously estimated at \$10,000,000 to \$15,000,000. The huge loss to fruit in the east is causing fruit men in the Pacific Northwest to regard the coming season for the marketing of fruit from this region from an optimistic viewpoint.

"In Every Respect" says the Good Judge



You get more genuine chewing satisfaction from the Real Tobacco Chew than you ever got from the ordinary kind.

The good tobacco taste lasts so long—a small chew of this class of tobacco lasts much longer than a big chew of the old kind. That's why it costs less to use.

Any man who has used both kinds will tell you that.

Put up in two styles

W-B CUT is a long fine-cut tobacco
RIGHT CUT is a short-cut tobacco

Weyman-Bruton Company, 1107 Broadway, New York City

Men who KNOW your truck engine

Your truck engine was designed to stand up and give full service. It's an investment that must show returns.

To give full service your truck engine must be correctly lubricated.

Our Board of Lubrication Engineers recommends the correct grade of Zerolene for the lubrication of your truck engine. These lubrication experts *know* your truck engine, know what it should do to give you a fair return on your investment.

Follow their recommendations as given in the Zerolene Correct Lubrication Chart. Ask for one. Use Zerolene for Correct Lubrication.

STANDARD OIL COMPANY
(California)



*A grade for each
type of engine*

Training Bush Fruit

(Continued from page 4)

young canes in place after they have reached that height. Picking is done mostly from one side. Where weaving is done on both upper wires, half of the canes of each hill are trained to one wire and half to the other. This plan gives greater spread between canes on the wires. Picking is done from each side.

The weaving system is an easy and fast method of training the fruiting canes and when well done it is usually very satisfactory.

Upright System

THE upright system requires a similar trellis, but the fruiting canes, instead of being woven to the wire are left upright and tied with a heavy string. When in fruit, the upper part of the canes will bend down within reach of the pickers. The young canes growing upright are held between the upper wires during the picking season and are not easily injured.

By this system training can also be done either on one or both upper wires.

The fruiting canes may be removed from the field and burned just after harvesting or just before training the new canes to the trellis in the spring.

Some growers, instead of trellising raspberries, prefer to cut off the tops of the fruiting canes at a height of about six feet. The berries produced are larger but not as early. The topping is best done just before the leaf growth starts in the spring.

Loganberries

CURL and fan system. Two common methods of training loganberries are to curl or spread the fruiting canes on two or three wires strung one above the other and stapled direct to posts 20 to 25 feet apart. Where two wires are used one is about 32 and the other 54 inches in height. The canes are raised on the wires and curled in a

more or less spiral form in both directions or spread out fan-shape. Where there is considerable wind it is best to tie the canes near the tips to the wires so that there is no chance of loosening.

The young or new canes are left on the ground and kept under the trellis during the growing season by bending heavy wires in the form of arches or by placing cross sticks every few feet along the row.

Evergreen system. Another system quite similar to that for training evergreen blackberries is used by some of the best loganberry growers with excellent results.

Evergreen Blackberries

OVERHEAD system. A good system for training the evergreen is to place the fruiting canes on a trellis of two wires and cross slats supported by cross pieces nailed to the posts at a height of about four feet from the ground. The wires are usually strung about 20 inches apart. The cross slats are notched to fit the wires and are placed about two feet apart. The canes are usually serpentine fashion over and under alternate slats and are held firmly to the trellis.

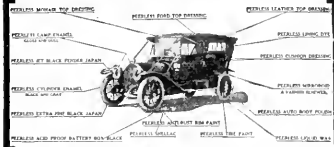
During the growing season the new canes are carried to a similar trellis about two feet above the fruiting canes. The cross pieces and slats on the trellis need not be quite so long nor the wires so far apart as on the trellis supporting fruiting canes.

Both trellises are supported by 8-foot posts set between plants 16 or 18 feet apart and two feet deep. Nine-foot posts well braced are used for ends. The trellis supporting the fruiting canes is of number 12 wire and number 14 for the new canes.

After the fruit is harvested or in early spring before the buds begin to swell the old canes are removed and burned and the new ones dropped to the lower trellis.

A common method of training ever-

PEERLESS AUTOMOBILE SPECIALTIES



Make Old Cars Look Like New

Your own car can be dressed and refinished in a few days ready for use—from the top to the tires—and when you overhaul the motor you need Gasket Shellac for tight gaskets.

THE GOODS AND WHERE TO USE THEM

Mohair Top Dressing. Waterproofs leaking tops and at the same time dyes faded material a black uniform color.

Leather Top Dressing. A black oil dressing that renews and softens leather and imitation leather tops.

Lining Dye. Dyes stained and faded linings a black uniform color.

Cushion Dressing. Brightens and renews leather and imitation leather upholstery.

Ford Top Dressing. Brightens, preserves and renews Ford top material.

Lamp Enamels. (Gloss and Dull) Rich air drying enamels, cover solid with one coat.

Cylinder Enamels. (Black and Gray) Fine air drying gloss, heat, grease and gasoline resisting enamels.

Black Japan. (Extra Fine) A fine air drying gloss enamel for all round use.

Fender Japan. (Jet Black) A heavy bodied, rich gloss, air drying enamel for hoods and fenders.

Liquid Wax. A hard drying wax polish in liquid form. Easy to apply and polish.

Auto Body Polish. An oil polish to brighten and renew varnished surfaces.

Mirroroid. A clear varnish for owner's use where the finish has lost its lustre.

Battery Box Black. An acid resisting enamel for wood and metal.

Rim Palat. A protective coating. Keeps rims from rusting and allows tires to be removed with ease.

Touch-Up Black. A quick air drying gloss enamel for all round use.

Gasket Shellac. Goes in tack quickly. Makes a perfect seal on all kinds of gaskets. Very Heavy Body.

Carbon Remover. A liquid that removes carbon and gives the motor more power.

Color Finishes. Air drying enamels for owners to paint their cars.

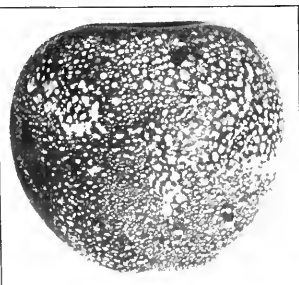
Dry over night. In the 8 colors: Straw Color, Yellow, Gray, Red, Blue, Green, Black and White.

Ask the Garage and Supply Dealer for catalogue and the goods. Complete directions on the back of each can tell how to use them. Sold in red lithographed cans.

Made only by

THE COLUMBUS VARNISH CO.

COLUMBUS, OHIO



Arsenate of Lead 6-200
No Spreader

Spreado

THE PERFECT SPREADER

Ready for Use

Simply stir into the spray solution. "Spreado" produces a uniform coating completely protecting the fruit. "Spreado" increases the adhesiveness of the spray, especially desirable in rainy seasons. "Spreado" increases the wetting and covering power of the spray, more than saving for itself in the saving of spray materials. "Spreado" does not in any way injure the foliage or fruit. "Spreado" is highly recommended as a spreader by Professor A. L. Lovett, Oregon Agricultural Experiment Station. Write for prices and samples.

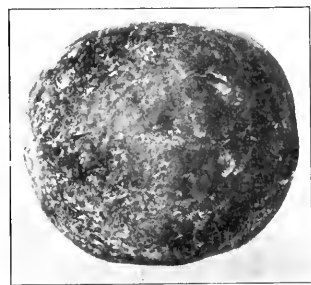
Manufactured by

MILLER PRODUCTS COMPANY

Sold by

OREGON GROWERS' CO-OPERATIVE ASSOCIATION

SALEM, OREGON



Arsenate of Lead 6-200
with 3 lbs. "Spreado"

GRANTS PASS, OREGON

MEDFORD, OREGON

greens is to trellis the fruiting canes at about four feet in height and the new canes underneath about 18 inches from the ground. When training is done the new canes are raised to the upper trellis.

Marketing Conference

(Continued from page 5)

districts to consolidate their marketing machinery.

THE FAILURE of the North Pacific Fruit Distributors has been a monument which certain speculators have been prone to point out to growers of the Northwest. The details of the plan of this organization were made subservient to the desire to get tonnage. The large salaries that were paid to the bell wethers of the different growing districts and the little attention that was devoted to developing a marketing system, will surely not be repeated.

The committee to be appointed by the American Farm Bureau Federation will include representatives of the Florida growers and of the California growers and of organized growers and authorities throughout the country. Its deliberations will be concerning not how to get more tonnage, but rather how to get an economical distribution.

There should be no personal attack upon individuals and private marketing interests that are not endeavoring to mislead the growers. There should simply be an elimination as far as possible of unnecessary factors and a stabilization of prices paid for fruit and the profits realized thereunder.

The national convention passed a resolution, however, warning the growers not to tie up their tonnage with private marketing concerns under the impression that they are participating in the movement towards co-operative marketing by so doing.


Box Shooks

East Side Box Co.

Manufacturers
SPRUCE AND
HEMLOCK

Box Shooks

Foot of Spokane Avenue
Portland, Oregon

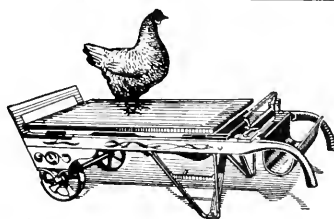


LABELS

*that reflect
the quality
of the goods
they cover*

SCHMIDT LITHOGRAPH CO.
SEATTLE LOS ANGELES FRESNO
PORTLAND SACRAMENTO HONOLULU
SAN FRANCISCO

Schmidt
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Weighs accurately, from 1 pound
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Write for terms, prices and
open territory

Renfrew Portable Scale

If you sell ANYTHING you need a
RENFREW

Weigh your berries for the cannery before they leave your farm—it saves much time at point of delivery. Your spuds or cull apples for the cider mill all must be weighed.

This fine weighing machine is a combination Scale and hand truck. You can wheel it to the object to be weighed and weigh it accurately on uneven ground.

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1901

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1921

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—It Is the Best Ever

The painstaking work of our 50,000 carefully selected local correspondents, 13 experienced traveling field men, and 75 skilled office employees is well reflected in the up-to-the-minuteness and accuracy of our ratings.

The 1921 Blue Book contains hundreds of new shipping towns, showing the shippers in those towns, as well as many new shippers, receivers, commission merchants, brokers, jobbers, etc. in old towns, with full ratings on all. The shipping indices, Law Digest, Trading Rules and Grades, Brokerage Rates, and other encyclopedic information has been brought up to date.

The twenty years of ancient history accumulated in our files, coupled with the continuous revision of our ratings—OUR RATINGS ARE IN A CONSTANT STATE OF REVISION—make our ratings the safest guide in existence for the fruit and produce trade. Every credit man knows that antecedent information is one of the most vital fundamentals of credit, and hence, ratings. Authoritative antecedents can only be gathered at the time of happening. When gathered later they are hearsay and hence are not as dependable. During twenty years of endeavor we have carefully assembled and verified the history of the handlers of the perishable products of the farm and orchard, and our entire organization is busy the year round doing just this, keeping our Produce Reporter Members posted up-to-the-minute at all times.

The "BLUE BOOK", while a vital part of Produce Reporter Service, is by no means all there is to it. Membership Service consists of:

Blue Book
Credit Sheet Weekly
Supplement Quarterly

Detailed Reports
Legal Advice
Business Advice

Inspections
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Each one of the features is essential to your business and especially in this year—of low commercial morality—when many of those who were stable and reliable a few months ago are near the rocks and an unusual number of difficulties are arising daily. Great credit discrimination is essential NOW, so get the national authority—the well and reliably known Blue Book and attendant service.

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Oregon Growers' Association Notes

PROSPECTS for a splendid crop of apples were never better in Western Oregon, according to reports received by the Oregon Growers' Co-operative Association. And not only are there indications of a fine crop, but sizes will probably be large. This favorable condition is due to the excessive moisture of the past winter, which has added largely to the vitality of the trees, and also to the fact that many trees have recovered from the great freeze of December, 1919. With these favorable conditions and at the same time reports of damage in the middle western states, as well as along the Atlantic seaboard and into New England, and a complete failure of the Arkansas apple crop, the indications are that the hox apple crop of the Northwest will be sold on a high market.

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BERRY conditions are also favorable in Western Oregon. Due to the large amount of moisture of the past winter, loganberry vines are looking especially vigorous. There has been a heavy planting of loganberries this past season and with the increase of the present year, and a fairly favorable market established, it is thought that in the Willamette valley alone the acreage will approximate 10,000 within a few years.

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NURSEYMEN report the planting of about 150 acres of filberts in the Willamette valley. C. I. Lewis of the Oregon Growers' Co-operative Association, says that Oregon and Washington can produce the finest filberts and walnuts in the world and that in these two states there are 10,000 acres adapted to filberts and walnut growing.

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IN SOME parts of the Willamette valley there has been planting of the Montemorency cherry, which produces a crop in about five years. It is said that this cherry is favored by canners.

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LEAF SPOT or anthracnose has done great damage to gooseberries the past few years and growers to combat this disease, are urged by Harry E. White, field representative of the Oregon Growers' Association, to spray carefully. The first indications of leaf spot, Mr. White says, are small black spots on the upperside of the leaf. Later on the leaf begins to turn yellow and will drop off by mid-summer. Spraying for this disease of the gooseberry leaf should not be delayed. The first should be an application of Bordeaux mixture using 5-5-50 strength. Then immediately after blooming period, the same of a 3-3-50 strength and after picking, again of 3-3-50 strength. After spraying the three times, if there is no indication of the disease, additional spraying is not necessary. But if there are signs of leaf spot, spraying should be continued every three or four weeks until fall.

CANNERY NOTES

THE business men of Rupert and Paul, Idaho, have under contemplation the erection of a \$60,000 cannery plant at the latter place.

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THE California Peach and Fig Growers, who recently purchased a site two blocks long at Merced, will build the first unit of a packing house this season that will be 80 feet wide by 120 feet long. The building will be of partial concrete construction with concrete floors and the work of building it will be commenced in time to have the plant finished in time to handle this year's fig crop.

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A PROCESS adopted by the Hood River Canning Company for making strawberries available for use in filling chocolates has resulted in this new confection being placed upon the market. Although many experiments have been made heretofore by candymakers in attempts to make strawberries firm enough for this purpose they have met with failure. The entire berry is used and the demand for this new candy specialty has become so popular that it is expected that much of the high-grade fruit handled by the Hood River company will be processed for this purpose in future. The variety of berry being used is the Clark Seedling.

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THE incorporation of the Falls City Canning Company with a capital stock of \$50,000, to be located at Falls City, Oregon, was recently announced. The incorporators are C. J. Pugh, J. A. Griswold and W. H. Weaver.



Make the "unseen" trees in your orchard produce

Your apple orchard is able to produce much more than it does now. By using

NITRATE OF SODA

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Interplanting

AS AN interplanted crop in cherry orchards, gooseberries and currants may be left several years depending on the growth of the orchard and the size of the bushes. In apple and pear orchards they may usually be left somewhat longer although the ground occupied should be restricted to one or

two rows of bushes through the center of the space between the rows. Otherwise the bushes will interfere with the proper care and cultivation of the trees.

As an interplanted crop in young orchards, currants and gooseberries, if properly handled are a profitable crop and provide an income in a short time until the tree fruits come into bearing.

*Spray
the*



*GMC
Way*

Time is Money

Why waste one-third of your time going to and from your filling station with your spray rig?

Your time is money. Save it by spraying the GMC way with a steady high pressure that will surprise you.

Your investigation invited.

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GMC on a Truck Is Like U. S. A. on a Bond

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S. S. NOORDERDYK	Loading End May
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LOS ANGELES—C. J. Lehman, 786 Pacific Electric Bldg.

SEATTLE—The Royal Mail Steam Packet Co., 204-5 Rainier Bldg. Phone—Elliot 1021.

Sub-Agents—A. M. Gillespie, Inc., Arctic Bldg., Seattle. Phone—Elliot 3526.

ASTORIA—E. M. CHERRY.

VANCOUVER—The Royal Mail Steam Packet Co., Pacific Bldg. Phone—Seymour 7108.

What They are Doing In California

JOHAN NAGLE, manager of the California Fruit Exchange, predicts a shipment of 40,000 cars of fresh fruit out of the state in 1921.

OF the 3,066,871 cases of the 1920 pack on hand January 20th last, the California Cannery League report a reduction of over 1,000,000 cases.

THE decrease in the acreage in cantaloupes in the Turlock district this year is reported to be about 1,000 acres less than last year.

A FREEZE which visited the state during the early part of April it is believed will involve a 50 per cent loss to capri or early figs. That this loss will curtail the production of Calimyrna figs also is certain, according to J. F. Niswander, vice-president and general manager of the fig association, on account of the fact that the Calimyrna fig is dependent upon the capri fig for pollination.

RESPONDING to the demand of farmers and orchardists for more information on the quality of the various dusting materials on the market, the division of chemistry of the California state department of agriculture is now engaged in a special study of the matter. Manufacturers have been warned to exercise more care in labelling and to correct certain misleading statements which have been made in some instances.

ACCORDING to late reports a bumper pear crop is forecast for California this year. It is stated that the increase will probably be 45,000 tons over the 1920 production of 90,000 tons. The raisin crop of 1921 is predicted to be 225,000 tons.

SACRAMENTO canneries started their season this year by putting up a large tonnage of spinach. It is reported that the biggest pack in the history of the fruit and vegetable industry of the Sacramento valley is expected by cannery officials this year.

To get a fine misty or fog-like spray with some life behind it from low-powered spray rigs, decrease the number of rods in use and the size of the openings in the discs of the spray nozzles.

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MILTON, OREGON

For their 1921 Catalog
Full Line of Nursery Stock
"Genuineness and Quality"



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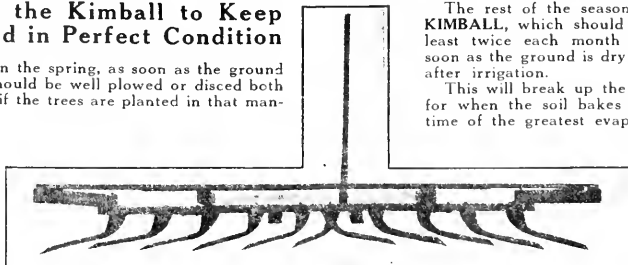
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Ground Chocolate



The KIMBALL CULTIVATOR—and a Perfect Mulch!

How to Use the Kimball to Keep Your Orchard in Perfect Condition

The first thing in the spring, as soon as the ground is dry enough it should be well plowed or disced both ways, or diagonal if the trees are planted in that manner.



The rest of the season nothing is needed but the KIMBALL, which should be run over the ground at least twice each month during the summer, or as soon as the ground is dry enough after a hard rain or after irrigation.

This will break up the crust and stop evaporation, for when the soil bakes and opens in cracks is the time of the greatest evaporation.

More cultivation and less irrigation will produce better fruit, and it will keep longer than where too much water is used.

The Dalles

W. A. JOHNSTON, Mfg.

Oregon

Sex of Strawberries

STRAWBERRIES produce two types of flowers, imperfect, or pistillate and perfect, or staminate. Imperfect or pistillate flowers contain pistils, but not stamens, while perfect or staminate flowers contain both pistils and stamens. Pollen, which is produced in the stamens is essential to the setting of fruit. A variety with perfect flowers, therefore, can produce fruit when planted by itself, but one with imperfect flowers can not set fruit unless perfect flowering plants are near to furnish pollen through the agency of bees or other insects. Because of this, varieties having imperfect flowers are not as desirable as those having perfect flowers, and fewer of them are grown. However, some of the sorts having imperfect flowers or "imperfect varieties," as they are commonly called, are very productive and are liked in certain sections. Imperfect varieties also are injured less by the strawberry weevil than perfect sorts, since this insect feeds on pollen, and in regions where it is serious, imperfect sorts are often grown in relatively large proportions. However, they form less than 5 per cent of the total acreage devoted to strawberries in the United States and their planting appears to be decreasing.

Where imperfect varieties are used the usual practice in planting is to set one row of a perfect variety for every two or three rows of imperfect ones.

There are certain varieties of strawberries that under ordinary conditions produce flowers having both stamens and pistils, but frequently, under peculiar weather conditions, they produce so few stamens that they do not have sufficient pollen to insure the setting of fruit. A variety producing an abundance of pollen should be planted with such varieties in the proportion that perfect varieties are usually planted with imperfect ones.

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Northwest Fruit Notes From Here and There

OREGON

THE LARGEST prune deal of the season was announced during the early part of the past month when the Drager Fruit Company of Salem purchased 1,450,000 pounds of Italian prunes in Oregon and Washington for shipment to Germany. Of the quantity purchased 1,025,000 pounds were bought from the Oregon Growers' Co-operative Association, 300,000 pounds from the Washington Growers' Co-operative Association, and 125,000 pounds from the Dundee Prune Growers' Association. The sizes were 70-80s, 80-90s, 90-100s, and 100-120s, and the deal is said to have cleaned up these sizes in the Northwest. The purchase is believed to have constituted the largest single shipment ever made in this section of the country.

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STATISTICS recently compiled give the apple acreage in Western Oregon during the past season as follows: Benton county, 1,336 acres; Clackamas county, 1,630 acres; Douglas county, 3,

287 acres; Jackson county, 5,091 acres; Josephine county, 400 acres; Linn county, 225 acres; Marion county, 2,417 acres; Polk county, 1,500 acres; Washington county, 1,500 acres; Yamhill county, 1,550 acres. According to this report Hood River county leads the state in apple acreage with 11,770 acres; Wasco county coming second with 5,660 acres and Jackson county third, with 5,091 acres.

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THAT the state of Washington is rapidly expanding its loganberry industry, of which Oregon now has 85 per cent, is shown in the fact that there were shipped from Marion county, Oregon, during the past winter 2,000,000 loganberry plants to be set largely in Northern Washington. On a basis of 660 plants to the acre this would mean that more than 3,000 acres of new plants would be in bearing in Washington in two years. Oregon is credited in recent reports with 5,500 acres and C. J. Lewis of the Oregon Growers

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Lath - Bracing Material
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SAWN OR ROTARY CUT

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Send your inquiries to the nearest office,
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Bldg.
Denver, Colo.

128 North Wells St.
Chicago, Ill.

R. R. Ave. & "B" St.
Yakima, Wash.



Co-operative Association estimates that within a few years there will be 10,000 acres of loganberries in bearing in Oregon.

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THE PRODUCERS' Canning & Packing Company, recently organized at Salem, has taken over the canning, packing and evaporating plant of the F. A. Kurtz Company and will operate it along co-operative lines. The plan is to have growers purchase stock in proportion to their acreage, which will entitle them to have their fruits processed and marketed, less the actual

costs of these transactions and 5 per cent of the selling price. The company is capitalized for \$125,000 and it is stated that more than \$100,000 worth of the stock has been subscribed. F. A. Kurtz will be manager of the company.

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A REPORT from the Hood River district is to the effect that wages of orchard labor there will be considerably reduced this year. Help that last year received \$100 per month, it is stated, this season will receive from \$65 to \$75 per month.

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FROSTS damaged fruits in some sections of the state during the past month. Strawberries are reported to have been injured to some extent in the Eugene district, while stone fruits and pears were considerably damaged in the Medford section.

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WITH 600 acres in strawberries this year Hood River is looking forward to a crop of 100,000 crates if the weather conditions continue favorable. Although a keen demand is anticipated for this season's crop, it is not expected that prices will rule as high as they did last year, when the record average price was received.

WASHINGTON

ESTIMATES of the acreage planted to berries in the state of Washington compiled by the district horticultural inspectors of the state are as follows: Strawberries, 2,100 acres; raspberries, 1,900 acres; loganberries, 350 acres; blackberries, 675 acres.

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ACCORDING to a check made in the early part of April by E. E. Samson, representative of the International Apple Shippers, there were 98,591 boxes of apples in common storage at Yakima at that time and 16,720 boxes in cold storage. To clean up the crop before the season for soft fruit shipments it was estimated that it would be necessary to ship out 150 carloads of apples weekly for two months. It is stated that this is a greater amount of apples unsold in the Yakima district at this time of year than in any previous season.

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A REPORT from Prosser is to the effect that the apple crop there has been entirely dissipated at satisfactory prices. This statement has caused considerable interest in Northwest apple shipping circles as the reverse has been the case in many of the districts.

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TO DO a general fruit and produce business John H. Wilson, F. C. Barthell and John H. Roberts have incorporated the Spokane Commission Company with a capital stock of \$15,000. Mr. Wilson is president of the company which has leased a warehouse.

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AT a meeting of the creditors of the Bohlke Fruit Company at Wenatchee, which recently failed, it was decided to have the affairs of the company administered by a trustee under the direction of a creditors' committee. A report submitted by C. W. White, secretary of the company, showed that the total assets have a value of \$1,167,000 and that the liabilities amount to \$1,328,000. Included in the assets are two warehouses at Cashmere and Wenatchee, over 200 acres of bearing orchard, which should yield 125,000 boxes of apples this year and 450 carloads of apples unsold in addition to accounts receivable of about \$200,000. The liabilities include \$580,000 due to growers and \$200,000 due to other creditors. It was shown that nearly \$1,200,000 had been paid out by the Bohlke Company to growers in the Wenatchee district before it became insolvent.

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THE announcement is made that another large cherry ranch has been started in Skagit county. The berry acreage is being planted by Charles C. Calahan near Burlington and consists of 33 acres. The varieties being planted are strawberries, evergreen blackberries, raspberries and loganberries.

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REPORT from Prosser is to the effect that fruit bloom in that district was the earliest in years. Judged by the bloom the crop is expected to be one of the heaviest ever harvested in that section.

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A CLASS of eleven ex-service men enrolled in vocational training work at the Washington State College recently made a ten-day tour through the apple growing districts of the state to secure practical instruction in cold storage practice and



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Seven days out of every week you'll get real smoke joy and real smoke contentment—if you'll get close-up to a jimmy pipe packed with cool, delightful, fragrant Prince Albert!

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And, you'll get the smokesurprise of your life when you roll up a cigarette with Prince Albert! Such enticing flavor you never did know! And, P. A. stays put because it's crimp cut—and it's a cinch to roll!



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orchard management. The class made the tour under the direction of H. Noel Bakke, member of the teaching staff of the elementary science department.

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IN the Zillah district, where there has been considerable new orchard plantings the varieties are chiefly confined to pears, peaches and prunes. The pears planted are almost entirely Bartlett's, the peaches Elbertas and the prunes largely of the Standard and Italian variety with a sprinkling of Tragedy.

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AN experiment in the treatment of collar rot which will be watched with interest was recently conducted at Natches, Wash., by County Horticulturist C. W. Hauck. It consisted in scraping the affected portions of the tree and applying a coating of Bordeaux paste, bridge grafting the roots still alive and the grafting of three young trees to the old above the diseased section by the inching method. The experiment was made in the presence of 25 orchardists, many of whom have trees that are affected with this disease.

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IDAHO

ACCORDING to William Crapo, manager of the largest canning and packing plant in Northern Idaho, there will be a decrease in prices paid to growers in that section for fruit and vegetables during the coming season. This is due, Mr. Crapo says, to the fact that many canneries were hard hit last year by the slump in foodstuffs and large losses prevailed throughout the West.

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UNDER the direction of C. G. Andrus, horticultural inspector for Nez Perce county, a power spray machine was recently put into service by the authorities of the city of Lewiston, and an intensive campaign against diseased trees conducted. The step was taken to insure proper treatment of all trees or shrubs affected with scale as previous experience had demonstrated that haphazard methods were permitting the disease to spread. Spraying has been made compulsory, both in Lewiston and Clarkston and the municipal authorities have control of the operations.

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Our officers welcome the opportunity of advising you how best to use these departments. Or a little booklet outlining the functions of each department may be had from the tellers upon request.

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Good standard grades. Well made. Quick shipments. Carloads or less. Get our prices.

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HOURS-STOCK LABELS FOR PEARS,
APPLES, CHERRIES & STRAWBERRIES.**

The Success Ewing Orchard Ladder

Scientific tests and calculations insuring
MAXIMUM STRENGTH
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Clear, Bone-Dry Spruce

6 foot Ladder weighs 24 lbs.
8 foot Ladder weighs 27 lbs.
10 foot Ladder weighs 31 lbs.
12 foot Ladder weighs 40 lbs.
14 foot Ladder weighs 44 lbs.
16 foot Ladder weighs 53 lbs.

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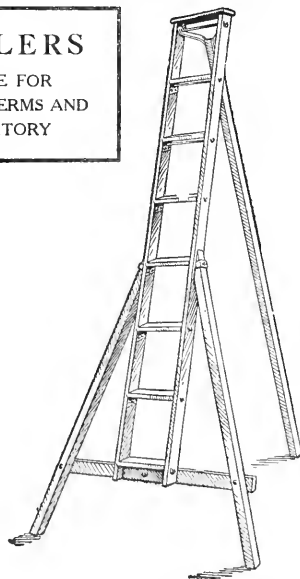
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Our New Water Export Gateway

By Charles A. Malboeuf

NINETEEN hundred and twenty marked the inauguration of direct water service between Pacific Coast ports and Europe. As a starter some 300,000 boxes of Northwest and California apples were shipped to British and Holland markets by steamer under refrigeration, and reached their respective destinations under record conditions that challenge admiration.

The average time between loading and discharging ports was thirty days, and the amount of cooerage required at unloading ports did not exceed three boxes per one thousand. The condition of the fruit on arrival, which was confirmed by subsequent inspection on the markets, was ideal. It did not suffer deterioration in the cold storage chambers of the vessel any more than it would have in the most efficient cold storage plant at shipping point.

Service begets service to the same degree as results beget results. The man who originated that axiomatic expression, while he perhaps did not say so aloud, or write it down for public benefit, evidently had the idea of efficiency tagged on to it in his own mind. It is certain that to have accomplished such results as the Holland-America line have displayed in their initial efforts, efficient management of the highest order played a very important part.

There has been a lot of talk about export markets and direct steamer service. Here it is already established and its first season finished in a fashion I think any one will agree surpasses our most earnest hope. Better still, we will have a second line of refrigerator vessels of the most up-to-date type, the Royal Mail Steam Packet line, to help move the 1921 crop. This service with that of the Holland-America, will give to Pacific Coast fruit districts, a total cold storage space of upwards of 500,000 boxes of apples.

London, Liverpool, Antwerp, Amsterdam, Rotterdam, Havre, Hamburg and other European markets will be reached direct through this new element in transportation. Sailings will be every three weeks early in the shipping season and during the heavy periods of movement, approximately every two weeks. Allowing three round trips per vessel, this service will provide a carrying capacity for the combined fleets of around one and one-half million boxes of apples for the season.

Granting that these schedules will be carried out, as we have every reason to believe they will, we can readily perceive the great possibilities now within



Don't Gamble with these Fellows

They always win!

YOU are gambling with them if you use any insecticide but THE BEST. But if you spray with GRASSELLI GRADE you are SURE they are dead—dead as the proverbial door nail.

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are a risk-proof investment. Backed by 82 years of dominant reputation for unquestioned quality, for uniformity to formula and for scientific accuracy of preparation the Grasselli label is your protection against disappointment at harvest time. See that this label is on the spray material you order. At conveniently located dealers in every fruit and farming community.

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GRASSELLI GRADE Insecticides and Fungicides



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San Francisco
Sacramento
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Portland
Seattle
Tacoma



our grasp for the development of foreign trade which were so effectually hampered by our former indirect facilities. Certainly this is the beginning of a vast change in our exporting system and although the change is a sudden one, there is no reason why we should

not put it into effect and strike our gait right off the bat this very season.

Up to March 26 New York state had shipped 20,000 more barrels of apples than at the corresponding date last season.

With the Poultry

CONSTRUCTING A TRAP NEST

A TRAP nest should be so constructed that when a hen enters, her back raises the door. This releases the catch or trigger and allows the door to close. The catch regulated by a screw or nail at the lower inside edge, should be set so that it just holds the door. It should have a washer on the screw to prevent sticking and a guard to keep away the nesting material. A variation may be made for large or small hens by shortening or lengthening the catch which supports the door or by adjusting the size of the triangular notch to the door itself.

The following directions are given by the United States Agricultural Department's specialists for constructing a three-compartment trap nest:

Cut four seven-eighth inch boards for ends and partitions, 12 inches wide by 19 inches long; enough one-half inch boards $39\frac{1}{2}$ inches long, laid lengthwise, to cover the top, back and bottom, and one strip $39\frac{1}{2}$ inches long and one and one-half inches wide for the front of the nests. Cut three pieces of half-inch boards, 12 inches long and three inches high, to hold the nesting material away from the door.

Nail the top, back and bottom to the ends and partitions, insert the three-inch strips in the nests and make the guard, nailing it to the left side of the nest. Bore a hole in the catch large enough that the catch will move freely when screwed into position on the side. Place a washer on the screw between the catch and the side of the nest. Insert a screw at the lower edge of the catch to stop it when set, so that it will just hold the door.

Make the doors of seven-eighth inch material, 12 inches by six inches and cut a triangular notch in the center four inches wide at the bottom. Put two screw eyes in the top of the doors and bore holes in the front of the nests, two inches below the top (inside measurement), through which a three-sixteenth inch wire is run to support the doors.

Attach to the front of the nests a narrow strip upon which the hens can jump. Place a button or block of wood on the front of each partition to hold the door when the nest is closed. If the nests are to be placed below the dropping board, a wire top should be used with a five-inch strip of wood on the front edge of the top to stiffen them.

SELECTING SHOW FOWLS

SUCCESSFUL exhibitors of show fowls do not leave anything to guess work. They begin the selection of the fowls soon after the chicks are hatched, figuring that unless the chicks are properly grown and fed that they may mature into typical representatives of their breed, they can not be considered as likely candidates for exhibition. The first actual selection of the birds to be ex-

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hibited is usually made by carefully observing the fowls as they appear in the yard or on the range. This is usually two months or not less than a month, before sending them to the show. While making these observations the main point that is kept in mind is to have the birds embody as near as possible all the general characteristics of the breed to be exhibited.

POULTRY NOTES

A GOOD insecticide for the poultry house can be made with a pint of kerosene in a gallon of whitewash. It is also a good plan to paint the roofs with kerosene.

TO PREVENT leg-weakness, bowel diseases and other ills give the young chicks an opportunity for plenty of exercise.

FOR feather eating try giving the fowls sulphur. The way to give it is one teaspoonful for every three birds, in the soft feed twice a week.

GREEN food is required by the little chicks as soon as they get out of the downy age. If they are let out on grass this requirement is taken care of. If not it should be provided. Cabbage, lettuce, kale, beets and similar vegetables will serve this purpose.

BONE meal will not take the place of green cut bone as a food. It is a good thing, however, to have the meal in a handy feeding place so the chicks can get at it if they want it.

A GOOD way to feed milk to poultry is to soak stale bread in it.

DUCKS are heavy eaters and require more bulky food than chickens. It is not a good plan to change the rations of ducks quickly. It should be done gradually. Access to plenty of drinking water and green food should also be provided.

IN FEEDING mash foods to young chicks the mash should never be sloppy, but just damp enough to adhere without being a mush.

SCABBY formation on the legs of poultry can be removed by a mixture of two parts lard and one part kerosene oil.

IT IS well to remember that proper feeding methods not only produce more eggs, but the eggs have a better quality and a firmer shell.

TO PREVENT head lice in little chicks rub a little sweet oil on the top of the head and around the bill when they are taken from the nest.

THE KEENEWICK-RICHLAND Marketing Union was recently ordered placed in the hands of a receiver. The financial straits of the union are said to be due to over-expansion on too small a sinking fund. The business, it is reported, will probably be continued under the receivership.

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STRAWBERRY plants, 100,000 Gold Dollar and New Oregon, \$5 per 1,000; Cuthbert and Mariboro Raspberry plants, \$2.50 per 100. Lawson Nursery, Gates, Oregon.

SUPERB AND PROGRESSIVE EVERBEARING strawberry plants will solve your fruit question. 100 plants should give you 100 to 200 ptes. berries this season if planted early in good soil, kept clean, moist and runners off. They come well packed to you, guaranteed, inspected and prepaid by insured parcel post at \$100, \$140; 500 at \$6; 1,000, \$11; 2 Luscious berry plants (with 100,000 others); Lucretia dewberry plants, 75c per dozen, prepaid. N. B. Matthiesson, Model Fruit Farm, Emmett, Idaho.

TREES—All kinds of fruit and ornamental trees, vines, etc. Growers of general nursery stock. Lowest quotations given on application. Send us your want list. Can also use a few good salesmen. Albany Nurseries, Albany, Ore.

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WANT to hear from parties having farm for sale. Give particulars and lowest price. John J. Black, 197th St., Chippewa Falls, Wisconsin.

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U. S. NAVY TENTS SPECIAL—While they last—9x9, 12-ounce at \$12.00. These are fine value and make pretty cheap housing for your extra help. Also have limited number tent flies—fine for wagon covers—10x15, \$9.00. Alaska Junk Co., 203 Front St., Portland, Oregon.

ARROW CARBOLINEUM kills chicken mites in poultry houses. Preserves wood against rot and premature decay. Write for circular and price. Carbolinum Wood Preserving Co., 222 E. Water St., Portland, Oregon.

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BEEKEEPERS MEET

WITH an attendance representing most of the sections of the state, the Oregon State Beekeepers' Association recently held an interesting meeting in Portland. It developed during the meeting that 10,000 persons in the state are keeping bees in either a small or a large way and it is estimated that 80,000 stands of bees are maintained in the state. Many of the beekeepers are also fruitgrowers. In discussing the poisoning of bees from spray applied to fruit trees it was the sentiment of the meeting that more can be accomplished in eliminating this trouble by education and co-operation between the beekeepers and fruit-growers than to attempt to secure legislation in regard to the matter. It was stated that if fruit-growers would apply the first spray for the codling moth just after the petals had fallen the damage to bees from this source would be reduced to the minimum. The Oregon Association has affiliated with the national organization and a campaign will be started to organize associations in each county. A. J. Sanford, of Redmond, was re-elected president; N. D. Baker, of Knappa, vice-president and H. A. Scullen of the Oregon Agricultural College, secretary-treasurer.

APPLE DISTRIBUTION

IT IS interesting to know that apples shipped from the Pacific Northwest have wider distribution than any other commodity shipped from one section. Reports to the United States Department of Agriculture from public carriers for the last five years show that 2,567 cities were used as distributing points. Telegraphic reports from railroads during the season of 1919-20 showed that 1,400 cities received carlot shipments from the Pacific Northwest. It is safe, therefore, to assume that complete diversion information would show a very much larger number of cities to which shipments were made.

TREES AND SHRUBS



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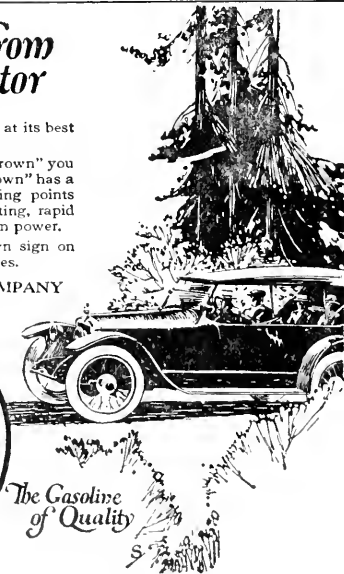
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VOLUME XV

JUNE, 1921

NUMBER 12



FEATURES IN THIS ISSUE

Use of Dust Spray in
California
Tractors in Orchard
Work
Relation of Bee Keep-
ing to Fruit Growing
The Value of Spray
Spreaders
Experiments in Cherry
Breeding

Color Plates by
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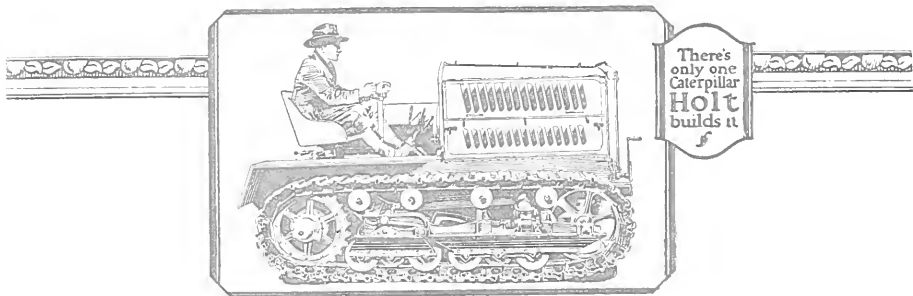
GEORGE AHREND'S ROSE Pink Frau Karl Druschki.

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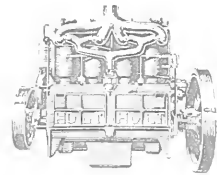
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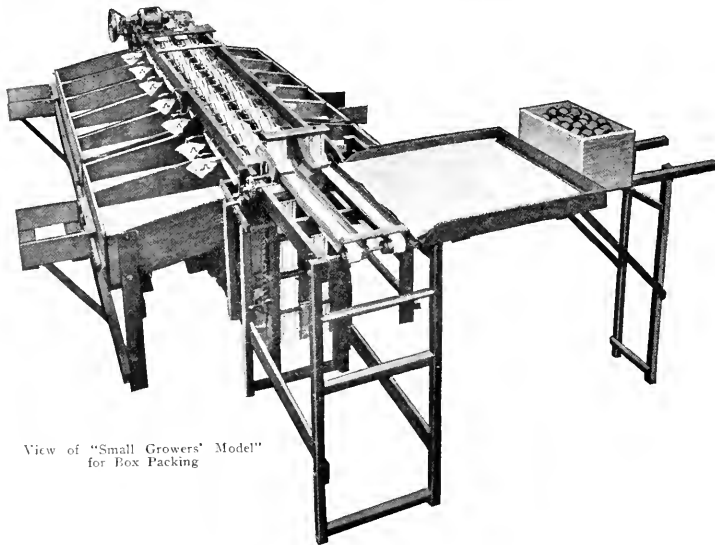
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Entered as second-class matter April 22, 1918, at the Postoffice at Portland, Oregon, under act of Congress of March 3, 1879

VOLUME XV

PORTLAND, OREGON, JUNE, 1921

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Use of Dust Sprays in California

By W. L. Howard, Professor of Pomology, University of California. In Charge Deciduous Fruit Station, Mountain View, California

DUST sprays, used both as fungicides and insecticides, have been in general use in California for many years. Dry sulphur has always been the standard remedy against mildew in grapes, and since the vineyard business in California has always been one of our most important agricultural industries, enormous quantities of sulphur have been used in dusting the vines. In no other instance, however, has a dry spray proved of practical importance in California as a fungicide. There has never been any serious effort to use dry sprays against diseases of tree fruits, except possibly to employ dry sulphur against the mildew in apples, and this was always a failure. Wet sprays, it may then be said, are now almost exclusively employed for controlling diseases.

In striking contrast with disease control, splendid success has attended the use of dry sprays against certain insects. One of the first marked successes in this direction was the use of sulphur dust against red spider on almond, peach and prune trees. The dust is applied, usually by means of a hand dusting outfit, after the insects appear in midsummer. It is believed that the killing principle of the spray depends upon the slow volatilization of the sulphur under the heat of the sun, and that it is these slowly liberated fumes that kill the mites.

During the past year or two, another long step has been taken in the use of dust sprays by the discovery of a new insecticide which can be used as a dry spray. The new dusting material consists of a carrier made of kaolin clay, which easily reduces to an almost impalpable powder, to which is added specific quantities of nicotine sulphate (Black Leaf 40). This material, the original brand of which is known as nicodust, is now available in different strengths, namely two per cent, five per cent and ten per cent. This spraying material was designed by Prof. R. E. Smith, head of the Division of Plant Pathology of the College of Agriculture

of the University of California, as a remedy against leaf aphid of walnuts. It had never before been possible to control this insect on walnut trees, mainly for the reason that the trees were too large to be successfully sprayed with liquids. It often required hours to spray a single tree properly with a liquid, and then the results were

Prof. E. O. Essig has secured some splendid results during the present season in the control of the rosy apple aphid by dusting with what is known as the double nicodust, which contains 5.9 per cent of nicotine sulphate. This corresponds very closely to the so-called ten per cent nicodust of last year. The dust seems to penetrate the clumps of



Applying Nicodust in the Orchard

far from satisfactory. The job may now be done with two per cent nicodust in a few minutes, and obtains a very satisfactory slaughter of the insects.

During the season of 1920 the Deciduous Fruit Station of the University of California found that a five per cent nicodust could be very successfully used in controlling thrips on prunes and pears, as well as on nursery stock. Owing to the fact that nicodust kills by the rather rapid liberation of the nicotine fumes, it is necessary to apply the material to the trees during the warm part of the day, under California conditions, as the nights and early mornings throughout the spring and most of the summer are apt to be very cool.

leaves that have been curled by the work of the aphid much better than liquid sprays, and the kill of the insects has been very gratifying. The same dust seems to penetrate the clumps of the mealy plum plant louse, with very promising results, even after the leaves have been badly curled.

Strange enough, the nicotine dust has not been a success against the red spider. This may possibly be due to the fact that the fumes are liberated too rapidly. Apparently after about three hours all of the nicotine vapors have become completely dissipated, whereas sulphur fumes are liberated more gradually and continue for days.

Arsenical sprays in dust form, as well as certain fungicidal sprays, are

now in general use in California, but all these are reduced to a liquid for spraying purposes. Dry arsenate of lead is now in almost universal use, and a dry form of lime-sulphur is rapidly supplanting the customary liquid lime-sulphur in the principal fruit districts. Dry Bordeaux, which is added to water, is now similarly being used by those who prefer Bordeaux to lime-sulphur or require it for certain purposes. The dry lime sulphur is mixed with water for spraying.

Beginning with the season of 1921, the Deciduous Fruit Station has been making extensive tests of dust sprays against brown rot. Judging from the results secured by peach growers on the Atlantic coast, first-class control by dusting is scarcely to be expected. However, if the apricot growers, for example, are prevented from spraying with liquids at the proper time on account of rains or wet soil, they would be content with a lower degree of control if this could be obtained by some other means, as by the use of a dust. The advantage of the dust will lie in the ability of the grower to get on the land with a lighter spraying outfit and be able to spray his trees much more quickly. Dusting outfits, as used against thrips in prune orchards for example, are able to cover from four to thirty-five or forty acres a day, depending upon whether a hand outfit or a gasoline power outfit is used.

Arsenate of lead as a dust has never been used, except in a very small way against such insects as the codling moth, and where it was employed it was not an unqualified success. The future development of dry sprays as insecticides seems to lie in the direction of those that give off fumes rather than in the use of arsenicals. What the future holds for dust as fungicides is problematical. Probably they will always be of only secondary value for the purpose, but even so they would have a place in the fruit grower's program and might be expected to be highly valued under the special conditions under which they are employed.

Dusting Costs

IN FIGURING the relative cost of dusting and spraying, Prof. H. H. Whetzel, plant pathologist of Cornell University, says that the time and labor saved in dusting may more than offset the relatively high cost of dusting material and that, if the factor of valuable time saved for other work be added dusting will have to be regarded as much the cheaper orchard practice.

"Why have fruit growers everywhere looked with such hope and favor upon this new method of applying fungicides

and insecticides?" asks Prof Whetzel in a paper presented before the New York State Horticultural Society. "Not primarily because you have seen in it a more effective means of controlling diseases and insect pests, but because you have discerned in it at once certain efficiencies and advantages over the application of fungicides and insecticides in liquid form.

"No intelligent and practical grower or expert would argue as yet that dry materials as such are more effective than liquid sprays. That their successful application in dry forms assures certain distinct advantages of decided economic value everyone has appreciated and acknowledged from the beginning; greater rapidity of operation and consequent saving of valuable time and expensive labor; more timely application and thereby more uniformly effective control; elimination of the undesirable waterhaul and its attendant difficulties, all these have been acknowledged without question or debate."

In a questionnaire sent out by Prof. Whetzel, the following results were shown:

"Did you dust your apples this past season? Yes 73.

"Did dusting control scab as well or better than spraying? Yes 49, No. 9. (Three were in doubt, twelve did not answer.)

"Did dusting control codling moth as well or better than spraying? Yes 51, No 6. (Two were in doubt, 14 did not answer.)

"Will you dust apples next season? Yes 68, No. 4. (One is in doubt.)

"Evidently apple dusting still looks good to about 95 per cent of the duster owners in this state.

"Recently I visited the Annapolis Valley, the great apple growing section of Nova Scotia. Picking of Gravensteins and some other early varieties was just beginning so that I had an excellent opportunity to see the fruit on the trees in its finished conditions. I visited many of the commercial orchards throughout the valley. Some 50 dusters were in use in this region. Every dusted orchard visited showed practically as good or better control of scab and insects than did the sprayed orchards. In a season said to have been the worst scab year since 1913 with unsprayed Gravensteins running approximately 100 per cent scabby, actual counts made by Professor Sanders in the orchard of C. M. Roscoe, dusted but three times, showed 91 per cent absolutely scab free fruits as against 97.5 per cent scabby on undusted check trees of the same variety in the same orchard. I found every dust user I met not only satisfied but enthusiastic over dusting. It was the consensus of opinion among

growers, investigators and fruit inspectors with whom I talked that dusting would very rapidly replace spraying throughout the valley.

"Considering the question then of the efficiency of dusting for scab and worm control on apples, on the basis of, first, experimental evidence and second, the opinion of the growers who dusted the past season, one is forced to the conclusion that dusting wins.

"In spite of the fact that the evidence at hand clearly proves dusting to be quite as effective as spraying for the control of scab and worms, I am well aware that its general adoption as a substitute for spraying largely depends upon the solution of certain accessory problems. The most important of these is an effective contact dust, a dust that will kill sucking insects like the aphid, red bug, psylla and the like. The problem clearly lies within the entomological field but it cannot be divorced from the problem of scab control."

Refrigerator Ships

APPLÉ growers of Oregon and Washington will be asked to co-operate with the citrus growers of California in utilizing the Panama canal and the new refrigerator ships now being developed for shipments direct to Europe through the canal. Shipping agents are arranging for many thousands of carloads of citrus fruits and northwestern apples to be handled in this manner.

The steamer *Charles H. Cramp* has been converted into a floating laboratory, plying between the Pacific Coast and the eastern seaboard through the canal, to determine the best conditions for the handling of citrus fruits and apples. Cargo space has been divided into compartments in which different conditions can be produced and controlled. In the tests it will be made possible to make records under variable transit conditions. Factors to be studied include the temperature, ventilation and humidity both individually and in combination.

On the first shipment of northwestern apples a 40 degree refrigeration will be experimented with. This test may be made in June.

IT IS not realized generally that farmers and fruit-growers own and operate fully fifty per cent of the automobiles and trucks in this country, the total of which now exceeds 9,000,000. They wore out half at least of the 24,000,000 tires used last year and will buy their share of the 27,000,000 tires required this year to keep the cars running.

Tractors In Demand For Orchard Work

By J. W. Ray

FROM the peach orchards of New Jersey, the apple orchards of Oregon, the citrus groves of Florida, the cherry orchards of Wisconsin, the pear and prune orchards of Washington, and the walnut groves of California comes indisputable evidence of the fact that tractors are replacing horses in or-

that the tractor increased the crop on fourteen acres to the extent of \$5000 in one year, because of the deeper cultivation permitted.

2. Horses are too slow to get the work done at the proper time.

The speed of the tractor, coupled with its ability to draw large implements,

ments close enough to the trunks of the trees to do most of the work formerly done by hand.

4. Horses cause considerable damage to trees, both by brushing against limbs, and by scraping the traces and single-traces against the trunks of the trees.

Tractors, if of the proper type, get in under the low hanging limbs without injury to the fruit spurs, and, because of their narrowness, can put the implements close to the trunks without danger of themselves coming in contact with the tree.

5. Horses require feed the year 'round. Since orchard culture requires power only about five or six months of the year in most sections, there is a long idle period during which horses produce nothing, yet have to be fed and cared for. Commercial orchardists grow very little horse feed. Grain must be bought. This makes expenses high.

The tractor is, of course, free from this objection. When not in use it can be stored away in a small shed and forgotten.

6. Horses suffer greatly from the heat when working at cultivation during the summer months. This is particularly true in level orchards where the trees are of bearing age.

An Illinois apple grower claims that his tractor paid for itself the first year because it made possible cultivation during the hot month of July.

7. Horses have severe limitations when it comes to operating the spraying outfit.



The Small Crawler Tractor, Because of its Compactness and its Smooth Exterior, Handles Implements Right Up to the Bases of the Trees.

chard work. In fact there is no other class of farming in which the tractor is so nearly universally used or in which it so completely displaces horses.

The reasons for this can be most clearly understood by pointing out in some detail the advantages of the tractor over horses, as outlined in reports from tractor salesmen in these different sections, and in letters from practical orchardists throughout the country.

1. Horses are not powerful enough to draw implements suited to the best orchard culture. If more horses are used the outfit becomes unwieldy and impossible to handle around trees.

The ample power provided by the tractor permits a much better quality of cultivation. Better plowing is done, particularly where there is a heavy growth of cover crop to turn under, or where it is desired to plow close up to the base of the trees. Disc harrows can be weighted and set to secure the depth and pulverization demanded for good work, particularly where it is desired to disc under a cover crop instead of plowing it. Spring tooth harrows may be set deep to tear up the soil. Subsoilers can be used to break up the hard pan formed by the plow sole.

A California walnut grower claims

remedies this very vital factor. Oftentimes this makes cultivation possible where otherwise it could not be done at all, and makes the difference between a good crop and a very poor one. Getting spring cultivation done early and quickly is a big item in the citrus groves of California.



Comparatively Inexpensive Wheel Type Tractor Is Popular Among Small Orchardists and Berry Growers.

3. Horses are large and teams are unwieldy around trees.

The tractor, especially one of the small crawler type, is much more easily handled around, under and close to the trees, making it possible to get imple-

Tractors make possible the spraying of hundreds of additional trees every day. This is because a larger sprayer may be drawn, and because more speed can be made in traveling to and from the

(Continued on page 16)

Relation Of Bee Keeping To Fruit Growing

By Dr. A. L. Melander, Entomologist, State College of Washington

THIS paper will deal with two aspects of the problem suggested by the title: first, the necessity of having bees in the orchard if the trees are to produce their maximum fruit yields; second, the necessity of changing spraying methods if bee keepers are to remain in the orchard districts.

Bees have long been known to be of value in pollinating plants, but, just how far fruit trees are dependent on bees is not so thoroughly known to the general fruit grower. A number of carefully conducted experiments have been recorded in various bulletins and reports from which the following citations have been gleaned.

Different varieties of fruit are either self-sterile, partially self-fertile or else entirely self-fertile. In the first instance, bees or other agencies for the transfer of the pollen grain are an absolute essential if the fruit is to set at all. In the second instance, where flowers are only partially self-fertile, a full crop of fruit would not result if all insects or other agencies for the transfer of the pollen were eliminated. In the third instance, of complete self-fertility, there are abundant records to show that crossing produces better fruit. *Hence, in every case the fruit grower will profit by having bees in his orchard. In no case are bees detrimental.*

Among the varieties of apples that are known to be self-sterile are the Arkansas Black, Gravenstein, Gano, Jonathan, King, Mammoth Black Twig, Missouri Pippin, Rome Beauty, Rhode Island Greening, Transcendent Crab, Wealthy, Winesap, Yellow Bellflower and York Imperial.

Among those only partially self-fertile are included the Ben Davis, Spitzenburg, Wagner and Yellow Transparent.

Among those that are self-fertile are the Baldwin, Grimes Golden, Dutchess of Oldenburg and Yellow Newtown.

Experiments conducted by the Oregon Experiment Station have shown that while the Spitzenburg is regarded as partially self-fertile, it produces only three per cent of fruit when self-pollinated, but when receiving pollen from the Arkansas Black it will set 70 per cent of its fruit. Similarly pollen from the Ortley, Jonathan, Baldwin or Red Check Pippin produces a heavy set on Spitzenburg while pollen from the Yellow Newtown produces only about 10 per cent set. Such experiments are the result of hand pollination, but are indicative of what would happen when bees visit from flower to flower.

Other varieties of fruit show a similar variation as to fertility.

Most pears require cross pollination since they are only partially, if at all, capable of setting fruit when self-fertilized. The California Experiment Station has demonstrated that plums and prunes will present a vastly heavier crop when cross-pollinated, both being more or less self-sterile.

Of the cherries, the Royal Ann, Bing, Black Tartarian, Lambert and Black Republican are self-sterile. Thirteen varieties of almonds experimented with at the California Experiment Station were wholly self-sterile. Peaches have also been demonstrated to be almost entirely dependent on the visits of bees if a good crop is to ensue.

Of the smaller fruits, raspberries, blackberries, strawberries, cranberries, etc., are all abundantly visited by bees and the amount of fruit that would set is entirely proportional to the number of visits.

THE question of the distribution of pollen by wind has been settled at the Oregon Experiment Station by fastening slips of vaselined glass in and near apple trees. So few pollen grains were caught on the sticky glass as to prove conclusively that wind is not at all an agency in carrying across apple pollen grains from one flower to another.

It has been proved that if blossoms do not receive pollen grains they fail to set. This is the main explanation for the familiar "June drop."

It requires one pollen grain for each seed, five pollen grains must therefore, fall upon and enter each apple flower, while the strawberry or raspberry would require many more grains.

When a pollen grain falls on the sticky stigma, the female part of the flower, it starts to grow down a tube carrying the sperm cells into the innermost parts of the blossom. The union of a sperm cell with an egg cell starts the growth of the seed. Unless all seeds are started, the fruit becomes misshapen in its growth, if it does not drop entirely from the tree. Hence a complete pollination with healthy viable pollen is the first requisite in the setting of a fruit crop. As shown some varieties of pollen seem to be better adapted than others in insuring a complete fertilization. Even in case of self-fertile varieties, pollen from other blossoms or better from other trees, or perhaps better still from other varieties, is needed for best results.

It is interesting to note that contrary to popular opinion pollen grains do not affect the color of the apple. A Spitzenburg pollinated by an Arkansas Black is no darker than if pollinated by a Yellow Newtown, but many more apples would set from the Arkansas Black pollen than if the pollen were obtained from a Yellow Newtown tree. The former pollen is more effective, more likely to start the complete production of seeds, hence the result is larger and better formed apples even though the color is not affected.

Many millions of years ago the first flowers came into existence and also the first bees. Since that time, these two developments of nature have worked up an inter-dependence so that the modifications of flowers as we now know them have been developed through the agency of bees. In a corresponding way the bees have become modified in their body parts, as an adaptation to floral structure.

FLOWERS develop showy petals to attract the bees. Nectar is produced at the bottom of the floral parts to force the bee to dip down as far as possible in securing it. Pollen is produced in over-abundance as a delicious food for the bees. Bees in their turn have developed a long tongue for lapping up the nectar, a crop for storing it for the flight home, a body covered with remarkable pronged hairs for collecting the pollen and adaptations on the legs, the pollen baskets, for scraping together and transporting the pollen load.

In the visits to flowers, bees come in contact with the pollen—the little grains covering their body are then rubbed on the sticky stigma often as a result of a remarkable arrangement in the formation of the flower parts. After pollination, the stickiness of the stigma dries up so that the flower is receptive only for a few days, usually at the beginning of the blossoming period. As a further result of pollination, the nectar ceases to be produced and the petals drop quickly. The flower is no longer attractive to bees.

Some trees have a tendency to over-set fruit, requiring costly thinning in commercial orchard practice, might be rendered less prolific if bees are withheld or if sprayed with some corrosive spray that would destroy the stigmatic surface. The only drawback to such a recommendation is that if carried out one would not be sure of a setting of fruit at all. Most fruit men would prefer to thin a super-abundance of fruit

than to run the risk of getting no setting.

At the beginning of the fruit blossom season an orchard should be humming with bees. In fact, by actual observation in normal orchards the honey-bee has been found to outnumber all other visitors of flowers a hundred to one. Other insects may be present, as for example, a few bumblebees, some wild bees, a few butterflies and several species of flies, but all of these combined would have little effect in cross-pollination if the honey-bee were excluded.

Where actual tests have been made where either branches or whole trees have been inclosed in netting so as to exclude bees, it has repeatedly been found that the fruit crop suffers. Many practical orchard men hire bees for the blossoming period, the usual price to bee keepers being \$5 per colony. Keeping a small apiary in the orchard will bring returns many times greater than the cost of the colonies. Everyone has noticed how fruiting has been interfered with by bad weather at blossoming time. When bees are not flying, the trees hold out the inducement of their blossoms a longer time, but if cross-pollination is not forthcoming a heavy June drop may be expected. This is an important factor in growing prunes, berries and other fruit, especially in western Washington.

In this mutual arrangement of give and take the fact must not be lost sight of that it is the fruit grower who profits most. The bees insure a crop of fruit. Due to their activity the crop is increased, perhaps by ten per cent, perhaps doubled. In return during the day or two that each flower is visited they get some pollen and nectar, not enough to build up stores, but only enough to stimulate brood rearing.

Freight Rates Must be Lowered

By THE EDITOR

INCREASED freight rates have precipitated a crisis in the affairs of fruit growers of the Northwest states which, unless early relief is granted, will result in smaller production and in many cases in ruin to the growers and corresponding loss of income to the railroads. This is the situation as presented to Henry J. Ford, interstate commerce commission examiner, by witnesses at the hearing held in Yakima last month.

Unless relief is forthcoming for this serious condition, growers must pin

their hopes to the development of water transportation, concerning which a meeting will be held at Seattle June 1. Apple exporters at that time plan to organize a corporation to handle all fruit shipped abroad and to the Atlantic seaboard. It is hoped to obtain pledges of 10,000 carloads of perishable products from the Pacific coast for water transportation.

At the Yakima hearing, J. Curtis Robinson, traffic manager of the Northwest Fruit Exchange, testified

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that if present freight rates had been applied at any time from 1912 to 1920, growers of fruit receiving highest average prices during those years would have lost an average of 33 cents a box on apples.

A. W. Stone, general manager of the Hood River Apple Growers' association, declared that if Hood River orchardists had their land and all equipment donated without cost with no depreciation, interest charges, nor taxes, their total costs would have been \$1.35 a box during the last year and their average net return of \$1.23 a box would have brought a loss of 12 cents a box.

F. A. Duncan, vice-president of the Yakima National Bank, which places 50 to 55 per cent of its loans directly or indirectly on fruit in normal times, said that the bank finds itself unable to make further loans in the face of the present losing situation of the fruit growers.

Hundreds of cars of potatoes have been fed to the hogs in Montana reported H. M. Louis, manager of the Northwest Potato Growers' Association.

H. M. Adams, vice-president of the Union Pacific System, appeared as spokesman for the carriers, introducing figures to disprove contentions of the fruit men, but declaring that if the roads could reduce labor and operating costs they would voluntarily reduce freight rates.

H. F. Davidson of Hood River was chosen to be chairman of the organization committee to arrange for formation of an export corporation at Seattle. Others on the committee are: R. W. Kelly, Hood River; B. A. Perham, Yakima; W. F. Gwyn, J. C. Porter and J. MacPhee Ferguson.

The meeting at Yakima decided that the export organization should work through established channels. Firms represented were the H. F. Davidson company and Kelly Brothers, Hood

River; Oregon Growers' Co-operative association, Salem; Wells & Wade, Wenatchee; Earl Fruit company, Spokane; Northwestern Fruit Exchange, Seattle; Thompson Fruit company, Richey & Gilbert, J. M. Perry & Company, Perham Fruit company, Yakima Fruit Growers' association and J. MacPhee Ferguson, Yakima.

Gopher Poison

ASTRYCHNINE poison devoid of bitter taste may be obtained from county agricultural agents in Oregon at cost for use in cradicating the gopher.

In using this poison the roots should

be peeled and cut in $\frac{1}{2}$ inch cubes. Six quarts of these cubes are treated by sprinkling one ounce of strychnine over them, stirring thoroughly to insure an even distribution of the poison.

Care should be exercised in exposing the baits. The main runway being located by the use of a prod about $\frac{3}{4}$ inch in diameter and through the hole made by this probe two or three of the poisoned cubes should be dropped into the main run and the prod hole closed with the aid of a firm clod. Caution should be exercised not to place the bait in the short lateral runway leading from the mound of earth to the main run.



In The Orchard

In the orchard, where insect pests infest the tops of the trees, a powerful sprayer is always necessary.

The American Beauty Dust Sprayer was designed to meet this very need. Its powerful blast forces dry insecticides to all parts of the tree, penetrating the center of every leaf and blossom cluster, thereby giving great protection.

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actually *less costly on the house or barn than cheap paint*. Don't allow surfaces to rot. It costs less to paint them.

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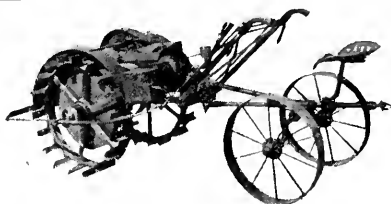
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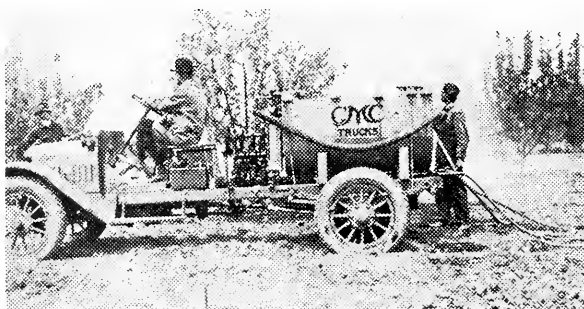
THE OLDSMAR plows, harrows and prepares the seed bed, plants the seed, applies the fertilizer, cultivates the field, harvests the crop, hauls, loads and does the work of a stationary engine. In fact, it replaces the horse or mule entirely on the small farm.

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Do Not Over-Spray Fruit

THE Washington State Insecticide and Fungicide board, in recent session at Pullman gives the following timely warning to fruit growers with reference to the over-spraying of apples and pears with arsenical materials:


"During the past few years there has been some agitation about the presence of arsenicals on western fruit and in a number of cases shipments have been condemned. Spraying with arsenate of lead or some other arsenical is judged necessary for the control of codling moth, and with judicious application fruit is never so coated as to become actually detrimental to health. But the heavy application of arsenical spray, the custom of frequent and particularly of late spraying, and the tendency of over-doing the spraying, have resulted in so much spray material adhering to the surface of the fruit, especially in the rainless districts where most of the commercial western fruit is grown, that many shipments have been condemned.

"Quite obviously, over-spraying is wrong and should be discouraged. It is wasteful of material; no additional benefits accrue from doubling the strength of the spray, or spraying oftener than the generally accepted spraying program calls for, or for continuing the application until the trees are drenched and dripping. Over-spraying causes a blotching of the fruit, irregularly coloring and a deposit of arsenic that wiping cannot eradicate. It is responsible for the poisoning of bees from the drip on the cover crop. It is giving orchard grown hay the reputation of being unfit for feed.

"Spraying practices for codling moth have been fairly well worked out and should be generally understood. Adequate spraying of fruit for this insect pest calls for at least four or five applications. The arsenate of lead need not be used stronger than three pounds at the most to every 200 gallons of spray. When the tree is best covered it has not begun to drip. Especial emphasis on the first brood of worms, particularly through the calyx spray, should make the later applications less essential. The use of a spreader with the arsenical such as sodium caseinate, increases the covering power of the spray and renders less material necessary. High pressure pumps better the application by forcing the spray against the skin of the fruit in the case of fan-spray nozzles, or by breaking up the spray into finer particles in the case of the spray guns.


"Bearing in mind and applying the principles underlying codling moth treatments should make it unnecessary for the west to become alarmed over

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poisoning its fruit so as to make it unhealthful. Its reputation for clean, carefully graded fruit has been built up on its methods of conscientious spraying. The public spirited orchardist should keep watch over his over-zealous neighbors as well as over his neglectful ones and impress on them both alike the necessity of safeguarding the reputation of western fruit."

The board comprises the following individuals: E. L. French, Director of Agriculture, ex officio; C. L. Robinson, Supervisor of Horticulture, chairman;

E. C. Johnson, Director of Experiment Station, vice-chairman; Dr. A. L. Felander, Entomologist, secretary; Dr. F. D. Heald, Plant Pathologist; George A. Olson, State Chemist.

The volume of fruit crop in the region traversed by the Denver & Rio Grande will be equal to, if not greater than, that of last season, reports W. H. Olin, the railroad supervisor of agriculture. In 1920 the territory produced 5093 cars, apples and peaches predominating.

Experiments In Cherry Breeding

By C. E. Schuster, Assistant Professor of Pomology, Oregon Agricultural College Experiment Station

PREVIOUS work by this station has established the fact that the Bing, Lambert, and Napoleon (Royal Ann) cherries are both self-sterile and inter-sterile varieties. These varieties cannot be expected to bear much fruit when self-pollinated; neither will they bear fruit when pollinated by either one of the other two varieties. Where these varieties have been planted singly or in combinations, the crops have been very small or nothing at all. Many reports are being constantly received that cherry trees ten, twelve and fourteen years old blossom profusely each year, but produce no fruit. Investigation of this condition generally shows that the trees belong to the Bing, Lambert or Napoleon variety and are receiving no pollen from any other varieties.

While these three above mentioned varieties are inter-sterile with one another, they respond readily to cross-pollination from several other varieties like the Black Republican, Black Tartarian, or the Waterhouse. The first two varieties mentioned being unsuitable for canning are not in general favor except for home use. The Waterhouse more nearly approaches the Napoleon in size, color and solidity; it is more satisfactory to the canners as it brings a better price to the canning trade than any of the other varieties used for pollination. Two types of Waterhouse are in cultivation, the long-stemmed and the short-stemmed of which the long stemmed is the more desirable.

If one were to go back to the early history of horticulture in Oregon, he would find that the Napoleon was often propagated by means of seed. Many of these seedlings were inferior, while others were almost identical with the parent and worthy of being kept as orchard trees. They were sometimes known as Napoleon or Royal Ann Seedlings; at other times simply as Napoleon or Royal Ann trees, and were often propagated by owners and set out

in orchards. From these orchards they were scattered by propagation in the nurseries over the state and as a result we often have a Napoleon type rather than a strictly Napoleon variety. Many of these are more or less inter-fertile with the Napoleon, Bing and Lambert varieties. This will undoubtedly explain the reason for the partial crop of Napoleons in many of the commercial orchards where they have planted the Napoleon, Bing and Lambert varieties in solid blocks.

Besides the problems of sterility, there comes up the question of susceptibility to disease. All of the sweet cherries are at times severely attacked by bacterial gummosis. On account of these problems breeding work with cherries was started. Seed, resulting from crosses on these varieties by several other varieties, was planted in an endeavor to reproduce a new heavy yielding variety of high quality, free from gummosis, self-fertile and inter-fertile with the Bing, Lambert and Napoleon. A number of seedlings were obtained, some of which have been bearing for three or four years.

In the spring of 1920, eighteen of the more promising of these seedlings were placed under test for self-sterility. Over 3300 blossoms were bagged and allowed to self-pollinate. From these blossoms a number of fruits developed to one-third or one-half size and then shriveled up and dropped off, but not one developed to maturity, indicating a condition of self-sterility for all of these seedlings.

On the trees where tests were being carried on, good crops of cherries were produced as a result of insect pollination. Due to the fact that there were many other seedlings blossoming in this lot, it is impossible to tell whether these eighteen promising seedlings were inter-fertile among themselves or were pollinated by the surrounding inferior trees. The question therefore of inter-fertility or inter-sterility between these trees re-

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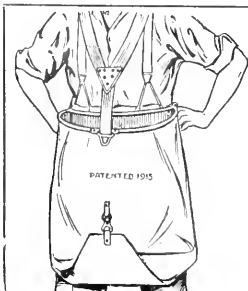
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mains to be determined by further tests.

Resistance to gummosis is variable. Several of the better seedlings have records showing almost complete freedom from the disease, while others are very susceptible.

The surprising feature of the experiment has been the relatively large number of trees that have produced fruit of medium or excellent quality. Only those of excellent quality have been retained. One of those kept for further tests bears fruit as large as that of the Bing variety, but ripens at the same time as the Black Tartarian. Another one of the Napoleon type, but larger than the Napoleon, ripens from a week to ten days ahead of the Napoleon. The last one to ripen is just taking color when the Lambert is ready to pick. Canning tests by the horticultural products section have demonstrated the adaptability of several varieties for the canning trade.

With all of the seedlings the question of inter-sterility or inter-fertility and the annual production of fruit per tree remains to be tested out. Unless a seedling, after being carried through all the tests, is unquestionably of much greater value than any other variety now in cultivation, it will be discarded.

Cross Pollination

By A. F. Gillette, Oregon Agricultural College

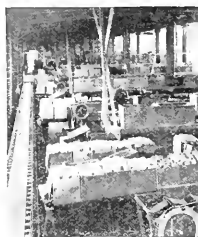
CROSS pollination of bartlett pears is proving to be of great benefit to pear growers in California to increase the set of fruit and to decrease the amount of June drop.

A series of experiments carried on at Davis, Grass Valley and Vaca Valley, by the department of horticulture of the University of California, show that cross pollination is beneficial in every case, although soil, altitude and climatic conditions seem to bear some relation to the amount of fruit setting.

The Bartlett pears in some of the valley districts seem to be self fertile, but in all cases where they are cross pollinated with some other good commercial variety they have a larger per cent of fruit set and lose a smaller proportion due to June drop, besides producing a better quality of fruit in most cases.

Due to its long blossoming season in California—March 15 to April 20—and to the inter-fertility of all pear varieties with it, Bartletts can be crossed with most any variety except a few early bloomers such as Anjou and Kieffer. The best results were obtained with the Winter Nelis and Comice.

In setting out a Bartlett pear orchard, especially in California, one should consider the point of planting intersets of good cross pollinators.



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Free Tolls

Howls of protest from newspapers in Mississippi valley states against proposed free tolls for American ships passing through the Panama canal ring insincere to the western ear. Either they are the evidence of a dog-in-the-manger attitude or they show the influence of transcontinental railroads on editorial policies.

The attitude is short-sighted, for the middle west will benefit almost as much as the Atlantic seaboard by the inauguration of free tolls. Unless shipping lines are able to compete on a parity basis with transcontinental railroad lines, freight rates to the east will remain as high as the traffic will bear. That appears to be elemental.

There is much that is unadulterated buncombe in the protest that free tolls would be unfair discrimination against foreign shippers.

The United States footed the bill for the construction of the Panama canal, and continues to finance its maintenance. Why should not the United States have the "edge" on foreign trade in the use of its own canal?

The west is vitally interested in the success of the free tolls program. Establishment of real competition between rail and water routes will hasten the return of normalcy.

BETTER FRUIT

Encouraging Signs

On the heels of the announcement of a reduction in the price of steel made by the United States Steel Corporation comes notice of 10 per cent cuts in the prices of farming and orchard implements by some of the largest manufacturers in the country. Reduction in published prices for 1921 of 10 per cent on all machines and implements, with the exception of motor trucks, manufactured by the International Harvester Company of America and a similar cut in implements fabricated by Deere & Co., of Moline, Ill., are the first to come to our attention.

It is a healthy sign. It is another step along the road to normalcy.

The interest of the manufacturer as well as the consumer is served in bringing buying back to a basis approaching the normal. Trade cannot be stimulated until confidence is restored and the buyer is convinced that no attempt is being made to gouge him. Stability is slow in following an era of inflation, but the present industrial outlook makes its early arrival appear certain.

In announcing its reductions, one manufacturer naively remarks that it means a "tremendous loss" to the company, but a loss it is willing to assume "in the hope that it will benefit the farmer or fruit grower in enabling him to buy more economically the implements he needs and at the same time increase the market for his products by giving employment to factory workers."

The average producer nourishes the idea that the "tremendous loss" is chiefly in anticipated profits. However, it certainly is a movement in the right direction.

There is no question that the reduction in the price of steel has no direct bearing on the manufacturing cost of implements being sold this year, as the raw materials already have been purchased at the higher prices. There is established, however, a lower replacement cost which rightly serves as a basis of a price to which purchasers are entitled and manufacturers should be willing to accept.

The attitude of these manufacturers is to be commended and it is to be hoped that buying will be stimulated.

Roses

In no section of the world are more handsome roses grown than the Pacific Northwest. Is there any logical reason why the fruit grower should not devote a portion of his few leisure moments to the culture of roses?

One need not be of esthetic temperament to enjoy things of beauty. A few hours spent about the orchard home in the planting of rose bushes, flowering shrubs and vines are not wasted. The little wife will appreciate these things far more than the man, whose thoughts are centered on the practical efforts in the field. Yet they brighten the home and make it a more pleasant place in which to live.

Flowers mean much in a woman's life. A little pampering of that love of the beautiful by the man of the house will make things much more enjoyable for her. A garden in which she may putter while her husband is guiding a spray hose among the trees provides healthful exercise as well. Not that she does not find enough work about her home, but this is pleasant work which borders on recreation.

Valuation of the beautiful in nature is a lesson which California orchardists may teach those of the Northwest. Orchard homes are often bowers of flowering beauty in that state. Many there are in the Northwest, but they are not so plentiful.

True, the blossoming of apple, cherry and other fruit trees provides a sight for the gods in the orchards of this country, but this spasm of coloring is but ephemeral. Give a little attention to flowers. It will be appreciated.

Farm Loan Bonds

To finance the federal farm loans a heavy issue of bonds has been placed on the American market. Fruit growers who are financially able will find little better investment. Not only will purchase of the bonds be profitable to them, but it will stimulate the farming industry generally by providing operating funds.

The federal farm loan bonds are non-assessable and free from income tax. They pay interest of five per cent and are issued in \$100, \$500, \$1,000 and \$5,000 denominations.

Nursery Law in Effect

IN accordance with a law adopted by the Oregon legislature last winter and effective May 25, nurserymen, their agents or solicitors must secure a license from the state board of horticulture before operating in the state. The law further requires that all nurserymen operating in the state furnish bond of \$1,000 to insure guaranties of reliability of stock. The law carries a penalty of \$50 fine or 30 days in jail.

More Broccoli Acreage

PRESENT indications are that there will be 475 additional acres planted in broccoli in the Willamette valley during the summer. Many growers last year cleared about \$300 an acre.

The usual practice is to sow broccoli seeds in a row from 18 to 24 inches apart and distribute the seeds thinly in the row, not less than an inch apart. The plants require from seven to eight weeks to make their seed bed growth. They will be ready to set out the last week of June or the first week of July.

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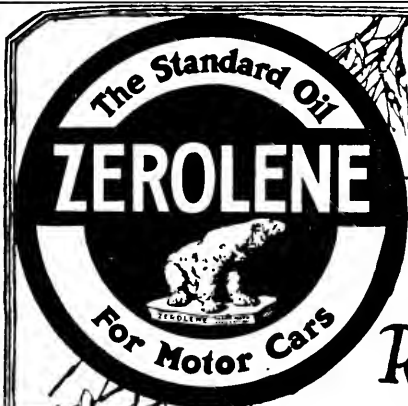
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Tractors in Orchard Work

(Continued from page 5)

filling station. Also, the steadiness of the tractor while spraying is being done from the spraying tower permits greater safety, comfort and efficiency for the operator.

An apple grower in southeastern Iowa claims that the tractor makes it possible to easily apply the first spring spray (bud spray) when the ground is often so soft that horses mire down or cannot pull the sprayer at all.

A Wisconsin cherry grower states that the tractor saved his orchard from destruction, by making it possible to control the "slot-hole fungus through more timely spraying and cultivation.

8. Tractors can operate on rough, hilly land so often found in orchards, where horses frequently find great difficulty in pulling any load.

A cherry orchardist near Sturgeon Bay bought a tractor when he was shown that it would make it possible for him to cultivate some of the ravines in his orchard which he had formerly left in sod.

9. Because of the lightness of the tread and the absence of and tendency to cut into the soil, crawler tractors can cultivate throughout the dry season in the Florida citrus groves without damaging the "water roots" which grow near the surface of the ground and are so essential to plant growth at this season.

10. In vineyards frequent and thorough cultivation, and timeliness in spraying are the factors of utmost importance. Only tractors insure success here. It is because the wine grape growers of France recognize this fact that they are making all their new plantings with sufficient width between the rows to admit the small tractor. A certain small tractor made in America and used in the war is being used quite widely, and is the standard gauge in determining the width of rows in new plantings.

11. In the cranberry marshes of New Jersey tractors have proved to be a great boon, because they make it easy to clear the land, and also make it possible to cultivate the marshes. Only crawlers can be used in this work.

12. The tractor furnishes belt power often needed in the orchard, such as for pumping water, running the cider mill, operating the fruit grader outfit, etc. Recent experiments have shown the practicability of using the tractor belt power for operating the pump of the spraying outfit while the sprayer is being drawn by the tractor. This eliminates the need for an extra motor for the pump. There seems to be a widespread demand for an outfit of this kind.



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For all of these reasons tractors are coming to be the standard power unit in commercial orcharding sections. The horses' day is past for this work.

Wenatchee Crop Big

THERE need be no fear of a short crop in the Wenatchee section. A survey just completed by District Horticultural Inspector Darlington and his staff indicates that by far the largest crop ever produced in north central Washington may be looked for, estimating a yield of 15,139 cars of winter apples and 1070 cars of soft fruit.

Comparing with former apple crops, it is found that 1920 produced only 9,358 cars and 1919, 12,358 cars. The soft fruit crop indicated for 1921 is: peaches, 250 cars; pears, 500 cars; apricots, 125 cars; cherries, 125 cars; plums and prunes, 70 cars.

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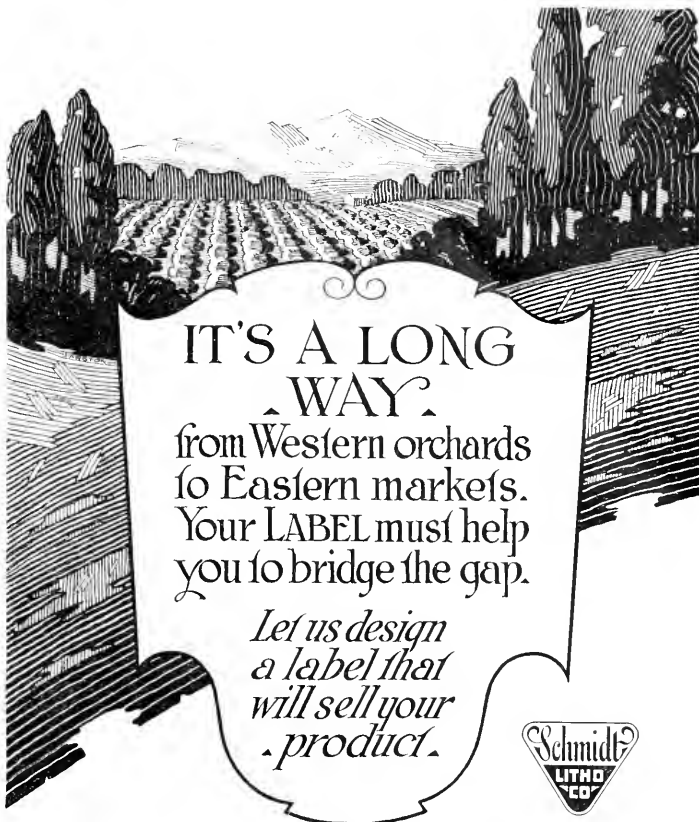
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This will break up the crust and stop evaporation, for when the soil bakes and opens in cracks is the time of the greatest evaporation.



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The Value of Spray Spreaders

THE use of the spreader in the poison spray solution which has come to be looked upon recently by expert horticulturists as very important to the orchardist is set forth in a valuable way to the fruit grower by Leroy Childs and A. L. Lovett in the crop pest report recently issued by the Oregon Agricultural College. In putting this phase of spraying before the orchardist these experts say:

"The use of a spreader in the poison spray solution accomplishes a number of desirable things. By increasing the wetting and covering power of the solution it permits a reduction in the amount of arsenic necessary for protection. By permitting a more uniform covering over the surface and increasing the adhesiveness, it affords a better protection from worms. Through the increased wetting and covering powers afforded, less solution is required to cover the trees and a tank of spray will go farther, finally allowing the spray to dry a smooth, even covering over the surface, an inconspicuous covering of the mature fruit is obtained. This does away with the blotchy, conspicuous poison coating so objectionable on the fruit when apples and pears are sent to eastern markets, particularly

since there has developed a tendency to discriminate against the heavily sprayed Western fruit.

"The investigation of possible spreaders and their economic value in improving the efficiency of the spray solution under commercial orchard spraying conditions has been under way for four years. Many of the problems in connection with the investigation have not as yet been satisfactorily solved, but of the materials tested as spreaders for cheapness, availability, combatibility, efficiency and ease of preparation, casein, miscible oil, glue and proprietary soaps appear to be the most satisfactory.

"The casein used in the preparation of the spreader is the commercial powdered or granulated casein as derived from milk. The material may be purchased through the local druggist, or fruit unions may obtain it in quantities. In preparing it for use, make up a stock solution as follows: Casein, 20 ounces, sodium hydroxide, 3 ounces, water, $2\frac{1}{2}$ gallons. Add the sodium hydroxide to the water and heat to the boiling point. While heating add the casein. Boil for ten minutes, replacing the water lost by evaporation. This forms the stock solution. For use stir

vigorously and remove one quart of the stock solution to add to each 100 gallons of spray. Where the casein is finely powdered a more simple method can be employed. This consists of four pounds of casein or parts by weight and twenty pounds of hydrated lime or parts by weight. These materials must be thoroughly mixed. Add the casein slowly to the lime (dry), while stirring vigorously. Pour the mixture from one container to another, repeating the operation until the materials are thoroughly mixed. Use one and one-half pounds of this stock mixture to 100 gallons of spray. The powder may be added directly to the spray tank. Pour the mixture slowly into the filled tank while the agitator is running. Start spraying at once or run the agitator for at least ten minutes to insure a complete solution of the spreader.

"MISCIBLE oil emulsion appears to be one of the most efficient spreaders, although the adhesive qualities of the dried material are not equal to casein. The emulsion is easy to prepare, readily obtainable and not excessive in price. The lighter grades of miscible oil are probably advisable. No tests of the various brands have been made, although theoretically there should be nothing in favor of one over the other. In the tests made we used the



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General Chemical Company's Miscible Oil No. 2. One gallon of oil was used to each 100 gallons of spray. Do not attempt to pour the spray directly into the spray tank. First thoroughly mix the oil emulsion in the container. Remove the desired amount of oil and add slowly with vigorous stirring, twice the amount of water. The solution should become a milky white emulsion of uniform consistency throughout without any evidence of free oil or soapy flakes. The emulsion may then be added to the filled spray tank while the agitator is in motion. The tank of spray should be applied at once."

Glue and soap are also mentioned as available for use as spreaders although the investigators have not found them as desirable for this use as the materials above described.

Damage to Prune Trees by Peach Twig Borer

By W. H. Wicks

Director of Bureau of Plant Industry, Department of Agriculture, Boise, Idaho

INSPECTORS of the Bureau of Plant Industry, state department of agriculture, began reporting the activities of the peach twig borer in the Emmett valley and the Sunnyslope, Central Cove district of the Snake River district west of Caldwell, as early as the 15th of March this year. As the season advances its activities are noticed in later prune and peach growing sections, where this insect is becoming a serious pest. The majority of the larvae are found at this time still in their hibernating quarters, while some have already emerged and are devouring completely the center of buds. The larvae enters the bud either from the side or the terminal end of the bud, feeding downward. The economic loss due to this insect is represented by the large number of buds destroyed between now and blossoming time, causing a reduction of the crop and the killing or deforming of the twig growth.

Owing to the extremely small size of the larvae at the time it is damaging the buds and the difficulty in locating its hibernating quarters, much confusion has arisen in regard to the kind of insect which has been doing the damage to the buds and twigs, which damage is readily apparent to the fruit growers, but the cause of the damage being difficult to trace. During the past two years the department of agriculture has called attention to the presence of this pest and wishes at this time to again emphasize the necessity of all prune and peach growers searching carefully for this insect. The damage done by this pest is increasing, in fact, there are several orchards which are most severe-



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ly damaged. A brief description of this insect will aid prune and peach growers to combat the same.

DESCRIPTION

THE adult is a dark gray-colored moth with four wings expanded about one-half inch and marked with darker spots (the adult is rarely seen).

The larvae is about 1-16 inch in length at time of hibernation in the fall and slightly larger at this date. It is the larvae which is destroying buds at this time and burrows down the twigs, usually entering the terminal bud. It is reddish brown with a blackish head and active. When full grown it will meas-

ure almost one-half inch in length. The eggs are white to yellowish, elongate oval in shape. The moths of the last brood deposit eggs late in August and September in crevices and rough places in the bark. When the eggs hatch, usually in about five to seven days, the young larvae dig small cavities in the bark at the base of the new wood, usually at the crotch of the limb where the winter is passed. The hibernating quarters can be found upon close examination (high power lens usually required), as indicated by small reddish brown mounds of elewed bark, and in some cases may be webbed together by bits of web. As spring advances the larvae begins feeding on the surrounding tissues and reach the surface in from ten to fourteen days. The young larvae immediately attack the buds, destroying young fruit and burrowing down the pith of the tender shoots, causing them to wither and die as the season advances, thus necessitating the uninjured buds below to send out annual growth. The same larvae will destroy a large number of buds each season, also a number of twigs.

When full grown the larvae crawl to the larger branches or the trunk, where they construct very loose cocoons consisting of a few threads of silk. Here the pupae period lasts from ten to

twelve days. The moths emerge and deposit eggs on the new twigs near the base of the leaves. When the eggs hatch in probably ten days the larvae feed on the tips of the young shoots and attack the fruit and eat out a considerable cavity in the flesh which usually fills with gum. They sometimes eat in the seed and destroy the kernel. The second brood reaches maturity in July and August and pupate in the basin of the stem end of the fruit. The third brood moths deposit their eggs as a rule around the insertion of the stem. This brood of larvae usually feeds entirely on the fruit.

CONTROL MEASURES

USE LIME sulphur, winter strength, 5 degrees baume in tank 200 gallons, adding arsenate of lead paste No. 8, or arsenate of lead powder No. 4. The lime sulphur kills most of the hibernating larvae and the lead is designed for poisoning the remainder at their first feeding.

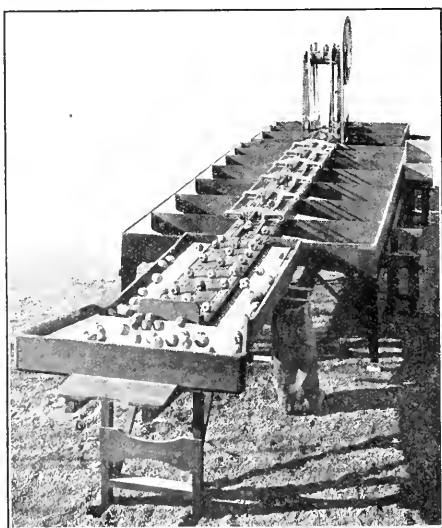
As damage is just now appearing in the warmer sections along the Snake river, prune and peach growers should lose no time in fighting this pest. Fortunately this spray will control San Jose scale and brown mite or so-called red spider. The arsenate of lead, however, is of no value for these two pests, but will do no harm.

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HOOD RIVER, OREGON

Fruit Growing in Coos County, Oregon

By A. C. Chase

COOS COUNTY, Oregon, is exceptionally well adapted to growing berries of all kinds, vegetables and certain varieties of fruit. The first impression one gets on coming into Coos county is the luxuriant growth of vegetation, wild blackberries, evergreens, wild gooseberries, currants and raspberries growing in profusion along the waterways. This leads one to believe that Coos county must have climatic and soil conditions which are very favorable for berries and fruit, and in this presumption one is not mistaken. Small acreages of berries of various varieties have shown exceptional production and the quality has been the best.

Coos county has an average rainfall of fifty-four and a half inches, which is one of its principal assets. The soil is well watered and with good cultivation crops never suffer for the lack of moisture. The temperature rarely ever exceeds eighty-five degrees, which is a very favorable temperature for growing berries of all varieties.

The rich sandy soil along the Coquille river and its tributaries is especially well adapted to the production of raspberries, loganberries, blackcaps and Evergreens. Strawberries do exceedingly well on the upland and one grower last season netted \$1,400 from an acre and a quarter of New Oregons and this spring sold \$350.00 worth of plants.

Over two hundred acres of berries have been planted to date for the Holt-Chase Canning Company, Inc., who operate a fruit and vegetable cannery at Myrtle Point. Great interest is being manifested by the farmers of this district in the small fruit and berry industry, as they are aware that this locality is well adapted to this crop, thus making a more diversified operation in the farming activity of the county.

The section of the county around Myrtle Point, Bridge and Broadbent produce a fine Gravenstein apple. W. E. Hartley, who lives at Broadbent, a few miles south of Myrtle Point, was awarded the gold medal for his exhibit of Gravensteins at the Panama-Pacific International Exposition in 1915. Many other varieties of apples do well here, having good size, color and keeping qualities. Bartlett pears, walnuts and cherries do well and there is a large amount of hill land that is available for planting. Codling moth and San Jose scale are unknown and trees with practically no care as to spraying show a very small per cent of scab.

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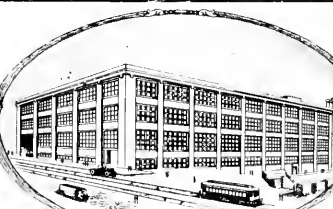
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H. C. Atwell, Forest Grove, 2.
S. E. Cummins, McMinnville, 2.
J. N. Latham, Vancouver, Wn., 1.
Dr. E. F. Hurtz, Vancouver, Wn., 1.
W. W. Silver, Newberg, 1.
A. L. Page, Jefferson, 1.
A. Bystrom, Monroe, 3.
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Blasted Soil

IT IS generally conceded that trees or other crops in blasted soil grow faster and yield bigger crops because they develop bigger, deeper roots and get more water and more food than those grown on land prepared in the ordinary way.

This growth comes from four sources soil, air, sun and water. The difference between top-soil and sub-soil is only a difference in the stage of decomposition or disintegration of the mineral particles of which the soil is composed, and in the amount of remains of plants mixed with the mineral particles. Ground near the surface has been exposed to the action of heat and cold and water and plants and has been changed more than the ground under the surface.

The ground for several feet deep is usually composed largely of plant food. The reason plants cannot use it in this hard state is because it has never been entirely broken up. The agencies which transform the minerals into available plant food have not had a chance to act. Almost all soils contain enough potash and phosphorous to supply plant food for a long time if it can be made available. Chemists and plant pathologists state that plants consume about twenty

one different elements. All but four of these being used in very small quantities and being abundant everywhere. The greatest percentage of food of all trees and plants, however, consists of nitrogen, potash, phosphorous and water and these are the foods that most frequently have to be supplied.

Roots of the different trees and plants go to various depths depending on the condition of the soil. If the soil is properly broken up investigations have shown that grain plants will go down four to six feet, grasses five feet, alfalfa ten to fifteen feet, potatoes three feet, apple trees ten feet, peach trees eight feet and citrus fruit trees to a still greater depth. Within whatever depth of ground the roots occupy must be stored the necessary amount of water and plant food. If the soil is not in a condition to allow the plant roots to receive their amount of moisture and food, naturally they will not thrive or bear so well. The great benefit from blasting in planting trees or loosening orchard soil that has become hard is in the response of the greater amount of water and food in the soil that almost immediately takes place. Once broken up with proper tillage the fertility of the soil can be maintained and kept in the best condition for maximum crop production.

Strawberry Flowers

STRAWBERRIES produce two types of flowers, imperfect, or pistillate and perfect, or staminate. Imperfect or pistillate flowers contain pistils, but not stamens, while perfect or staminate flowers contain both pistils and stamens. Pollen, which is produced in the stamens is essential to the setting of fruit. A variety with perfect flowers, therefore, can produce fruit when planted by itself, but one with imperfect flowers can not set fruit unless perfect flowering plants are near to furnish pollen through the agency of bees or other insects. Because of this, varieties having imperfect flowers are not as desirable as those having perfect flowers, and fewer of them are grown. However, some of the sorts having imperfect flowers or "imperfect varieties," as they are commonly called, are very productive and are liked in certain sections. Imperfect varieties also are injured less by the strawberry weevil than perfect sorts, since this insect feeds on pollen, and in regions where it is serious, imperfect sorts are often grown in relatively large proportions. However, they form less than 5 per cent of the total acreage devoted to strawberries in the United States and their planting appears to be decreasing.

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SEATTLE—The Royal Mail Steam Packet Co., 204-5 Rainier Bldg. Phone—Elliot 1021.

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VANCOUVER—The Royal Mail Steam Packet Co., Pacific Bldg. Phone—Seymour 7108.

the usual practice in planting is to set one row of a perfect variety for every two or three rows of imperfect ones.

There are certain varieties of strawberries that under ordinary conditions produce flowers having both stamens and pistils, but frequently, under peculiar weather conditions they produce so few stamens that they do not have sufficient pollen to insure the setting of fruit. A variety producing an abundance of pollen should be planted with such varieties in the proportion that perfect varieties are usually planted with imperfect ones.

According to a recent report of the United States Bureau of Crop Estimates, the commercial acreage of strawberries in the United States for 1921 will show a considerable increase over that of the preceding year. It is estimated that the acreage in strawberries this year will be 37,219 acres as compared to 48,619 acres in 1920, giving an increase of 8,600 acres.

Orchard cultivation should start with a rush now. Clear, sunny days causes the ground to dry rapidly. It often pays to hire extra teams or a tractor in order to plow just at the right time so subsequent cultivation will be cheaper.

—O. A. C. Experiment Station.

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And, besides Prince Albert's delightfulness, there's its freedom from bite and parch which is cut out by our exclusive patented process! Certainly—you smoke P. A. without a comeback. Joy'us? You'll say so!

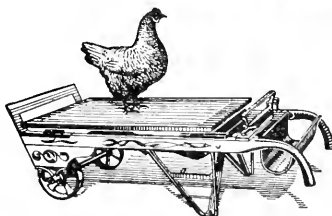
Prince Albert is the tobacco that revolutionized pipe smoking. If you never could smoke a pipe — forget it! You can — **AND YOU WILL**—if you use P. A. for packing!

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Paulus Heads Oregon Association

R. C. PAULUS, prominent in fruit circles of the northwest and sales manager of the Oregon Growers' Co-operative association since its organization in August, 1919, was elected general manager of the association and Oregon Packing Corporation at the annual meeting of directors and executive committee of the association.

C. I. Lewis, former manager of the organization department, was made assistant general manager. All the management of the association will now be centered at the Salem office.

Mr. Paulus, until the association was organized, was manager of the Salem Fruit Union. He has held positions of trust in a number of the large horticultural associations in the west and northwest.

Mr. Lewis was for 14 years head of horticulture at the Oregon Agricultural College and is a recognized authority on all matters pertaining to horticulture.

The Oregon Growers' Co-operative Association, during the past year, has shipped about 1,500 cars of fruits and vegetables, according to the report of the sales department, submitted at the annual meeting.

Of the 12,000,000 pounds of prunes delivered to plants of the association, all had been sold up to April 26, excepting 3,077,043 pounds. Eighty markets were developed for Oregon prunes, forty of these buying in car lots or more. The state of New York was the heaviest purchaser, receiving 1,940,015 pounds. England bought 861,550 pounds in direct shipments from Oregon plants.

Of loganberries, the association sold 1,072,956 pounds at an average price of 12.7 cents. Of cherries there were sold 1,014,955 pounds, also at an average of 12.7 cents. Other average prices were: Gooseberries, 7.9 cents; raspberries, 20 cents; strawberries, 16.9 cents; currants, 10 cents; evergreen blackberries, 7 cents; green prunes, 4.4 cents.

Of the 210,930 boxes of apples shipped by the association, England was the heaviest buyer, receiving direct shipments of 86 car lots. Apples were sold in 35 markets with New York City taking 59 cars, Los Angeles, 44 cars, Chicago, 35 cars, Baltimore, 15 cars and Memphis, 10 cars.

A total of 5,555,953, pounds of pears were sold the past season to 59 markets. Of the 402 cars shipped, New York City took 123 cars; Havana, 11 cars; Canada, 10 cars; London, 12 cars. From the Rogue River valley, with Medford and Grants Pass as shipping points, were shipped 4,575,095 pounds.

The association handled 85 per cent of car lot shipments of broccoli out of Oregon. There was a total of 27,514 crates.

The Oregon Growers' Co-operative association was organized at Salem, Oregon, August 1, 1919, with 137 members, controlling 3,000 acres of fruits and berries. The membership now is 1648, controlling 28,838 acres.

While the Oregon Growers' Co-operative association shipped 50 varieties of apples last season, Mr. Lewis says that for the benefit of the apple industry, there really should be grown only about ten varieties.

These ten varieties, he says, are: Spitzenburg, Newtowns, Ortleys, Rome, Grimes, Winter Bananas, Delicious, Jonathans, Gravensteins and Wagner. It would be better, he contends, if this list was cut down to the first six varieties names.

What They are Doing in California

COUNTY Horticultural Commissioner L. O. Haupt, of Hanford, in a recent report says: "The planting season has closed showing a heavy planting of trees and vines, especially the latter. Shortage and high price of vines curtailed the planting somewhat. The following were inspected and planted besides stock grown by the growers themselves, which was not inspected:

Apriots	25,956
Peaches	33,141
Prunes	22,777
Miscellaneous (trees)	5,286
Grapevines (rooted)	1,189,652

"The Tilton was the principal variety of apricots planted; Lovells lead in the peach varieties, while prunes were limited to the French variety almost entirely. About half of the vines were Thompson Seedless, as this variety was the only one that could be secured at reasonable prices."

EIGHT Japanese strawberry growers from various parts of the state are in the Oakland city jail charged with violating the standard packing laws of the state. D. P. T. McDonald, deputy horticultural commissioner, of Alameda county, swore to the warrants. The Japanese were traced through boxes of strawberries placed on the Oakland wholesale markets. These boxes, it is alleged, were packed with a top row of fine ripe berries, while the bottom rows were composed of overripe and diseased berries.

SAN FRANCISCO has received its first car of Mexican watermelons. Owing to the strict regulations pertaining to the introduction of Mexican fruit flies, a rigid inspection of the shipment was conducted by quarantine inspectors of the state department of agriculture.

CANNERY NOTES

THE canning situation is very uncertain, according to R. C. Paulus, general manager of the Oregon Growers' Co-operative Association. Canneries have no orders for future delivery and hence have no means of knowing how much to can or how much they can pay growers for fruit and berries. Wholesale houses are not placing heavy future orders, buying on a hand to mouth basis. If this continues, Mr. Paulus says that the trade will be out of canned goods before another season and in the meantime considerable portions of fruit will have spoiled. Cannerymen, bankers and growers are giving much thought to the canning proposition, Mr. Paulus says, and that some plan may be worked out, although at present it is difficult to say just what this plan will be.



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ARTICLES on incorporation have been filed by the Silverton Producers' Canning Company, which is capitalized at \$100,000. The incorporators are Fred Uphoff, J. R. Mero and M. E. Lee.

Northwest Fruit Notes From Here and There

WASHINGTON

A VOLUNTARY petition in bankruptcy has been filed in the U. S. District Court in Spokane by the Bohike Fruit Company through N. M. Sorenson, its attorney. Accompanying the petition was a schedule showing liabilities amounting to \$1,309,248 and assets of \$847,471. With this petition was filed another from the creditor's committee, named some time ago through Attorney D. A. Shiner, asking that William A. Doelle of Cashmere be named temporary receiver to take charge of the company's affairs until a permanent trustee is appointed. This action comes as a culmination of the investigation into the affairs of the company instituted by creditors when they took over the Bohike affairs April 2.

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CAR LOT shipments from the northwest, by districts, from July 1, 1920, to March 1, 1921, were as follows:

Wenatchee valley, 1862; Yakima valley, 7659; Spokane district, 2764; Southern Idaho, 2244; Hood River, 2166; Walla Walla district, 433; Montana, 436; Rogue River district, 369; Western Oregon, 263; Eastern Oregon, 266.

▲ ▲ ▲

ESTIMATES of Yakima Valley's fruit crop, based on inspections made after the late frosts, show little change from that announced four weeks ago by H. A. Glen, general agent of the Northern Pacific, at Yakima, whose crop predictions have generally proved reliable. Mr. Glen estimates: Apples, 12,500 cars; pears, 2500 cars; peaches, 1200; plums and prunes, 140; cherries, 259; melons, 400; total, 16,990 cars. His figures include Yakima and Benton counties, but not Kittitas county, which produces little fruit.

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THE Wenatchee District Co-operative association, recently perfected, has signed up 4250 cars of apples in the Wenatchee valley, according to C. A. Campbell, cashier of the Citizens' State Bank of Leavenworth. The new organization has completed a selling arrangement with the North American Fruit Exchange, which will open an office in Wenatchee.

▲ ▲ ▲

ABOUT 250 acres have been planted to berries in the Aberdeen section this spring. While these will not bear this year, a large acreage planted last year will come into bearing.

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CAREFUL examination of many orchards in the Wenatchee section shows there is no foundation for pessimistic reports. There has been a heavy dropping of blossoms and embryonic fruit, but there are still enough apples left on the trees to insure a record breaking crop, according to all authorities. The extraordinary heavy bloom made it necessary for 75 per cent to fall off or else be pulled off in thinning. Prospects still indicate a bumper crop of cherries, apricots, peaches, pears and apples, despite the drop.

▲ ▲ ▲

TWENTY-FIVE thousand boxes of Yakima apples, shipped from Seattle the last week in March, arrived in England on May 4 in perfect condition, according to a cablegram. The message quotes the market at "from 16 shillings to 17 shillings, six pence a box." Australian Jonathans, now reaching the English market, are selling for 28 shillings or \$3.30 a box, for extra fancy at present exchange rates.

▲ ▲ ▲

THE first crate of strawberries to be ripened this spring in the Prosser section of the Yakima valley was brought in by J. Harkema and won the prize given annually by the commercial club.

▲ ▲ ▲

P. S. DARLINGTON, district horticultural inspector in Okanogan county, north of Spokane, states that the late frosts have done no damage to fruit in the Okanogan valley, and judging from a wealth of bloom the apple crop this fall promises to be very heavy.

▲ ▲ ▲

WITH the prospective apple crops in other sections damaged by early frosts, thereby making the demand for northwest apples greater



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106 East Jefferson Street

this year, fruit growers throughout the Spokane district are looking forward with optimism to a good season this year in spite of low prices, according to P. R. Parks, manager of the Spokane Fruit Growers' Company.

"Prospects now look very favorable," Mr. Parks said. "While a late frost is always to be considered we always consider the crop fairly safe after May 20, so that chances for damage this year are slight."

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THE contract for the construction of a two-story packing house with an air cooled storage capacity of 40,000 boxes, to be built on the six-acre tract of the Winthrop Fruit Company at Gleeed, Wash., has been let to Kelley & Sons of Selah.

▲ ▲ ▲

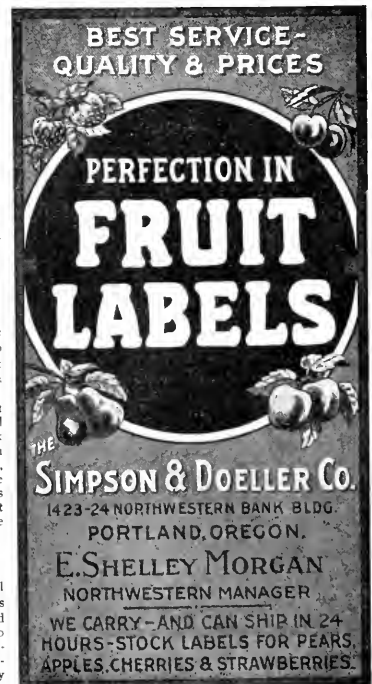
IDAHO

NOW that the "big freeze" is over and the fruitgrowers of the Payette valley are able to take stock of the damage done to their crops, it is manifest that the damage done is not nearly as heavy as was at first feared.

Orchardists and shippers alike estimate that the 1921 apple crop will be the largest harvested in the valley for some years. Pears also look promising, although the earlier varieties have been somewhat damaged. Sweet cherries have been, though they are by no means all gone, and the sour cherries promise well. Peaches and apricots suffered more than any other variety of fruit, but as there are comparatively few of them in the Payette valley this does not mean a big loss.

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PRESENT indications are that Idaho will have a normal commercial crop of apples and prunes, a very light crop of cherries, and practically no peaches or apricots, according to W. H. Wicks, director of the Bureau of Plant Industry, Boise. In the northern counties, particularly in Boundary, the peach trees were nearly all killed by winter injury. The outlook is very promising for Bonner, Kootenai and Latah counties. At Lewiston on account of rainy weather during the blooming period an exceedingly heavy drop of cherry blossoms was occasioned from the lack of proper pollination. In the Weiser district, most varieties of the apple show only a small number of blossoms killed, which still leaves more apples than can develop. The Delicious and White Winter Pennain seem to have suffered the most. In the Rossvelt, Panama and Apple alley section, peaches, apricots and early varieties of the apple are practically a total loss.



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With the Poultry

LATE HATCHED CHICKS

LATE hatched chicks are usually something of a problem to the poultry raiser. These chicks may be made profitable if they are cared for separately and not allowed to run with the other chicks. If but one yard is available, make a feeding coop for the baby chicks into which the older chicks cannot stick their heads. The danger to the late hatched chicks from the older chicks mainly comes from two reasons. They may stunt the late hatched chicks by robbing them of their food, or they may give them chicken lice.

A mistake sometimes made with late hatched chicks is to try to raise them out of doors without heat. No matter what the season young chicks need to be kept warm, especially at night. The temperature of the hover should not be less than 90 even in July. This heat must be available to them until they are feathered.

TREATING GAPES

IT IS during the early summer that most of the trouble is experienced by poultrymen with gapes in chickens. This trouble is caused by worms in the windpipe of the affected fowls. The larva of this parasite is picked up by the chickens in the damp earth which attach themselves to the windpipes of the fowls, where they first cause irritation and later as they grow and develop obstruct the air passages.

Treatment for chickens affected with gapes is to place them in a pen or room which has been sprinkled freely with slaked lime. A few drops of turpentine added to the rations is often beneficial in controlling the disease. Methods used to dislodge the worms are to use a feather dipped in turpentine and passed down the chicken's windpipe or pulling them out with a twisted horse hair. Instruments for this purpose can also be secured at poultry supply houses.

Prevention methods are to lime the soil where gapes infected chickens have run; keeping them from running under outbuildings or in damp places. Chickens badly infected with gapes should be killed while those unaffected should be confined in a yard freely sprinkled with a liberal amount of freshly slaked lime.

POULTRY NOTES

FEED for poultry should never be allowed to become sour or fermented. It should be kept fresh and wholesome.

KEEPING a strict account of both the expense and proceeds of fowls is the only way to know if they are paying. This requires but little time, but it is a very important item in successful poultry keeping.

A GOOD way to prevent drinking vessels and feed troughs from developing disease germs is to scald them out with hot water every few days.

IN BREAKING up broody hens do not use harsh methods. Broodiness is nature's provision for rest and the measures adopted for overcoming it should be along intelligent lines.

AS WARM weather comes on is the time to keep a close watch for vermin. Remember that whitewash and kerosene are cheap and effective, so don't be afraid of using it too frequently.

KEEP the young pullets vigorous and growing without pushing them too fast, for on them depends the future supply of eggs.

GRAIN is a necessity in the feed of every well developed poultry flock. Bran, sloppy feeds and allowing the flock to range will not keep it in the proper condition either to produce eggs or to be marketed unless grain is fed.

AN indication of head lice on young chickens is when they become dopey, hank their wings and sprawl on the floor unable to walk. When this condition is noticed they should be given immediate attention. A good preventive is to grease their heads at least once a week.

THE orchard affords an ideal ranging place for poultry. They devour innumerable enemies of fruit trees as well as getting plenty of exercise in scratching up the ground in search of bugs and worms. The orchard also provides them with shade during the hot days.

REMOVE the male birds from the flock as soon as the hatching season is over so as to produce infertile eggs. Infertile eggs keep much better than those that are fertile in addition to the fact that the male bird has no influence on the number of eggs laid.

THE hen's greatest profit producing time is the first and second years. For this reason she should receive the greatest care and attention during this period.

BRIEF rules for the poultryman who desires to raise his egg standards are as follows: 1. Keep the nests clean; provide one nest for every four hens. 2. Gather the eggs twice daily. 3. Keep the eggs in a cool, dry room or cellar. 4. Market the eggs at least twice a week. 5. Sell, kill or confine all male birds as soon as the hatching season is over.

What Papers Interested in Fruit Are Saying

AT any rate there is something radically wrong with the railroads. For instance, cabbage growers in the Rio Grande Valley of Texas receive \$9 a ton for their product. The freight and icing charges to Houston and Dallas amount to practically \$15 per ton, or two and a half times the original cost of the product. The rate to Kansas City is more than \$31 per ton, or better than five times the amount the grower receives. You can figure it out for yourself; we're in a hurry to go to the circus.—New York Fruit Trade Journal.

SOME people cannot seem to get it out of their heads that they can break the Oregon Growers' Co-operative Association, and that it is legitimate to resort to almost any means to accomplish this end. They believe that if the Oregon growers can be done away with, that the growers will be at their mercy, and they need not worry very much about what the growers think of them.

Recently we have been told on pretty good authority that one concern has stated they were willing to spend \$100,000 to break our organization. These insidious attacks do not worry us very much because they always prove to be boomerangs, and hurt more the men who inaugurate the move, than they do the organization.

We are making friends every day. We are growing every day. We hope we will always be classed as an organization with vision, with breadth and that we will be charitable in our ideas towards others. That we will build ourselves, not by tearing others down, but by putting across a good, constructive program to upbuild Oregon.—The Oregon Grower.

THE railroads are great at issuing permits to farmers to "gather drift wood on the shores." They will encourage production of 50 cars of watermelons, cabbage or onions where only one car of corn or cotton grew before. But, when the time of shipping comes the railroads are just as apt as not to demand freight in advance and at rates that are as high or higher than the product will sell for at destination. Thus after the driftwood is gathered the roads take both their own and the farmer's share. But, the farmer is expected to be tickled because he has had a job.—The Packer.

TO DATE a total of 9870 motor trucks have been registered in Oregon. The lighter trucks prevail with those under one ton and from one to one and one-half-ton capacity leading by many hundreds above all others. Around 2000 trucks range from two tons to five tons capacity.

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OUR SPECIALTIES ARE APPLES AND PEARS

O. A. C. NOTES

COMMERCIAL fertilizers are best applied to land as soon after plowing as possible, reports the soils department. When it is applied early the rains carry it into the soil, dissolving it and making it available for the plants. Many instances have been found where fertilizer was purchased and left in the barn through the entire season. Experiments have proved that late applications, though better than none at all, do not bring the returns that early applications do.

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SEED grades and regulations of Idaho will be explained at O. A. C., June 13-18, by B. F. Sheehan, state seed commissioner for Idaho. The Oregon seed regulations will be gone into by C. W. Hawley, state dairy and food commissioner and member of the college board of regents. In view of the fact that considerable seed of certain kinds crosses the Oregon-Idaho borders the seed laws for home sales and inter-state shipments are regarded as important marketing factors. These two men are high authorities on these matters in their respective states.

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GOOSEBERRY leaf spot or anthracnose is very troublesome this season in western Oregon. The bushes should be sprayed with lime sulphur (1 to 35) which controls mildew also. Immediately after harvesting the bushes should be sprayed with bordeaux 4-4-50.

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MUCH defoliation may be expected this season from cherry and prune leafspot, where this disease is known to occur, unless the trees are sprayed now with bordeaux (4-4-50). This disease is caused by cylindrosporium. The trees should be sprayed now and again in a month. The disease attacks the leaf stems causing the leaves to turn yellow and fall and also the stems of the cherries causing the cherries to shrivel. This bordeaux spray will also aid in the control of brown rot.

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"PROSPECTS for good crops of small fruits, especially are excellent in the region of Dallas, Sheridan, Dillay, McMinnville, Forest Grove, Newberg, Dundee and Salem," says W. S. Brown, chief of horticulture at O. A. C. "The prune crop evidently will be small, due to the dropping of the young fruits. Apple and pear crops are of excellent size and quality."

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OREGON GROWERS' ASSOCIATION NOTES
 THE Oregon Growers' Co-operative Association has advanced its prices on prunes, according to an announcement made by R. C. Paulus, general manager.

The association is now getting nine cents a pound for prunes, 40-50 size, packed in 25-pound boxes, f. o. b. the coast and in some instances a better price. Efforts are being made by the association to strengthen the price on smaller sizes of about one cent a pound.

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ALTHOUGH it is a little early to form a definite estimate of the prune crop, reports coming to the association from all prune districts indicate considerable loss, especially in the hill orchards. These blossomed a little later than the lower lands and were caught in the rain and cold weather during blossoming period.

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TREES—All kinds of fruit and ornamental trees, vines, etc. Growers of general nursery stock. Lowest quotations given on application. Send us your want list. Can also use a few good salesmen. Albany Nurseries, Albany, Ore.

FARMS FOR SALE

WANTED—To hear from owner of good ranch for sale. State cash price, full particulars. D. F. Bush, Minneapolis, Minn.

WANT to hear from parties having farm for sale. Give particulars and lowest price. John J. Black, 197th St., Chippewa Falls, Wisconsin.

EXCEPTIONAL ORCHARD BARGAIN—50 acres fine bearing apple orchard, best varieties, in good district; has had best care and attention and is in excellent condition; attractive buildings with running water in them; fully stocked and equipped for operating; should produce 6000 packed boxes this year. Offers for \$18,000; \$5000 down, balance can be paid out of crop. Luddenmann Co., 913 Chamber of Commerce Bldg., Portland, Oregon.

CALIFORNIA FARMS near Sacramento for sale. Write E. R. Waite, Shawnee, Oklahoma.

LOGGED-OFF LAND in Stevens County, Washington, at greatly reduced prices: Why bother with fruit land at high prices when you can get good dairy and stock land at from \$5.00 to \$20.00 per acre? Write for folder. Phoenix Lumber Co., Dept. B, Spokane, Wash.

POULTRY

BABY CHICKS—"Only the best." May and June delivery. White and Brown Leghorns, R. I. Reds, Barred Rocks. Safe arrival guaranteed. All vigorous chicks from good layers. Send for circular. Stubble Poultry Ranch and Hatchery, P. O. Box 67-L, Palo Alto, Cal.

SALESMEN WANTED

MEN with proven ability capable of selling a line of high grade nursery stock on a commission contract. Weekly cash advance. Splendid territory may be had by answering immediately. SALEM NURSERY CO., 427 Oregon Building Salem, Oregon

AGENTS WANTED—Benedict Nursery Co., 185 East 87th St., Portland, Oregon.

MISCELLANEOUS

THE CUTLER FRUIT GRADER is the LEADER. Nearly 1,000 now in use. The market demands well-sized fruit. Use a CUTLER GRADER and better your pack. Built for both box and barrel packing—in small and large models. Send for literature. Cutler Mfg. Co., 353 E. 10th St., Portland, Oregon.

ARROW CARBOLINEUM kills chicken mites in poultry houses. Preserves wood against rot and premature decay. Write for circular and prices. Carbolineum Wood Preserving Co., 222 E. Water St., Portland, Oregon.

TOBACCO—KENTUCKY NATURAL LEAF, chewing and smoking; rich, ripe and mellow; two and three years old, aged in wood; 2 lbs., \$1; 7 lbs., \$3; sample 10 cents. Maddox Bros., Dept. 22, Mayfield, Ky.

TOBACCO—Kentucky's Natural Leaf Smoking or Chewing; mild or strong; aged in wood; rich and sweet. 5 lbs., \$2; second grade, 10 lbs., \$2.75. Postpaid. Waldrop Bros., Murray Ky.

IDAHO CLOVER HONEY, 10c POUND—Two 60-lb. cans, \$12; 60 lbs., \$6.25; charges collect. 10 lbs., prepaid, \$2.50; rich, thick, light color, delightful flavor. Browne, Box 499, Twin Falls, Idaho.

HERE'S A REAL BARGAIN while they last: U. S. army tents, 9x9, 12-ounce at \$10.00. These tents make the best of housing for your pickers. They are cheap at this pre-war price. Also have some more of our famous tent flies—ideal for wagon covers to protect your fruit when hauling, 10x15, \$7.50. Alaska Junk Co., 203 Front St., Portland, Oregon.

BOOKKEEPER—Learn complete elementary bookkeeping in your spare time at home. Makes income tax reports easy. Only \$37.50. Write for terms. The Lincoln Institute, Spokane, Wash.

Statement of Ownership

STATEMENT of the ownership, management, circulation, etc., required by the Act of Congress of August 24, 1912, of the Better Fruit, published monthly at Portland, Oregon, for April 1, 1921.

State of Oregon, County of Multnomah—Before me, a notary public in and for the state and county aforesaid, personally appeared C. J. Owen, who, having been duly sworn according to law, deposes and says that he is the business manager of Better Fruit, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by section 443, postal laws and regulations, printed on the reverse of this form, to-wit:

1. That the names and addresses of the publisher, editor, managing editor and business managers are:

Publisher, Better Fruit Publishing Company, Inc., 281 12th St., Portland, Oregon. Editor, W. H. Walton, 281 12th St., Portland, Oregon. Managing Editor, None. Business Manager, C. J. Owen, 281 12th St., Portland, Oregon.

2. That the owners are: (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock.)

Owner, Better Fruit Publishing Company, Inc., Portland, Oregon. Stockholders, Jerrold Owen, 281 12th St., Portland, Oregon; D. L. Carpenter, 800 Oregonian Bldg., Portland, Oregon; E. E. Faville, 800 Oregonian Bldg., Portland, Oregon; A. W. Steyes, 800 Oregonian Bldg., Portland, Oregon.

3. That the known bondholders, mortgagees and other security holders owning or holding 1 per cent or more of the total amount of bonds, mortgages or other securities are: (If there are none, so state). None.

4. That the two paragraphs next above, giving the names of the owners, stockholders and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also in cases where the stockholders or security holder appears upon the books of the company as trustee or in any other fiduciary relation the name of the person or corporation for whom such trustee is acting is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner, and this affiant has no reason to believe that any other person, association or corporation has any interest, direct

or indirect, in the said stock, bonds or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding, the date shown above is: (The information is required from daily publications only.)

C. J. OWEN,

Business Manager.

Sworn to and subscribed before me this first day of April, 1921.

(SEAL)

GEORGE H. CARR,

Notary Public for Oregon.

(My commission expires April 29, 1925.)

The Friend Mfg. Co. of Gasport, New York, who make the Friend Spray Mixing Machine, report that they received FORTY-TWO inquiries from the one display advertisement they have thus far run in BETTER FRUIT this season.

Gebhardt, Scudder & Hendrickson

Attorneys at Law

610 Spelding Building, Portland, Oregon

Attorneys for Better Fruit Publishing Co.

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